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JAMES P. PORTER, *Editor*
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D. B. LUCAS. The Impression Values of Fixed Advertising Locations in *The Saturday Evening Post*

RUDOLF PINTNER AND GEORGE FORLANO. A Comparison of Methods of Item Selection for a Personality Test

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THE IMPRESSION VALUES OF FIXED ADVERTISING LOCATIONS IN THE SATURDAY EVENING POST

D. B. LUCAS
New York University

THE purpose of this study was to measure the relative impression values of different fixed advertising locations in the *Saturday Evening Post,* and to compare these positions with the run of the paper (r.o.p.). Eleven fixed locations, often called the preferred positions, were consistently maintained through the years of 1935 and 1937, during which this study was made. They are:

Inside front cover (or second cover)
Pages 1, 2 (½ page), 3 and 4
First page after the main body of editorial matter (Campbell Soup Co.)
Center-spread (two pages)
Page opposite the Lulu cartoon
Page opposite the Index of Advertisers
Inside back cover (or third cover)
Outside back cover (or fourth cover)

Values[1] ranging from 33 to 52 were found for locations which were regularly occupied by advertisements having identical physical qualifications. Page 4, which maintained an average score of 52, was well above the average of r.o.p. four-colored advertisements, namely 41. The inside back cover was almost equally far below the average with a score of 33. The impression values of different advertising locations were determined

[1] The reported values are statistically corrected scores or indices. These scores should, however, approximate the actual percentage of readers who get a measurable psychological impression of advertisements of each type or location.

by a method which will be described and compared with the techniques heretofore employed.

In the main this study follows techniques used in the studies enumerated below.[2, 3, 4, 5, 6] However, an analysis of these studies shows that they are all open to one or more major criticisms with regard to technique and interpretation. Following are some of the more obvious criticisms, together with a partial explanation of methods used to reduce similar faults in the present study.

Test material and other factors were not representative. Ferguson limited his research to the January 13, 1934, issue of the *Saturday Evening Post*. This was the "Auto Show" issue with two-thirds (29 out of 44) of the paid full advertising pages devoted to new automobiles and accessories. The present study included eleven issues, all apparently typical, in order to get a representative average.

Conditions were not natural for reading advertisements. Hotchkiss and Franken encouraged their subjects to read the *Saturday Evening Post* by giving them a reading assignment in the tested issue. Door to door calls were made in the present study to find readers who had seen each issue under normal home conditions.

Guessing on the part of respondents was not adequately accounted for. Gallup had no positive method of checking guessing. Others used old advertisements as a control group, but Rogers and Brown have proved this method to be of doubtful validity. The control advertisements in the present study were secured from new magazine copies released in advance.

No allowance was made for confusion of test advertisements with similar copy used in the same campaign or elsewhere.

[2] L. W. Ferguson. Preferred Positions of Advertisements in the *Saturday Evening Post*. *Journal of Applied Psychology*, 1934, 18, 749–756.

[3] George Gallup. *Survey of Reader Interest in Saturday Evening Post, Liberty, Collier's, Literary Digest*. 1931 (Liberty Research Dept.).

[4] G. B. Hotchkiss and R. B. Franken. *Attention Value of Advertisements*. Report of New York University Bureau of Business Research, 1920.

[5] H. W. Rogers and H. C. Brown. Testing Copy Tests. *Advertising and Selling*. October 22, 1936.

[6] E. K. Strong. *Attention-Value of Advertisements*. Research Bulletin (of Association of National Advertisers) No. 7, March 13, 1914.

This criticism seems to apply to all attempts to measure the effects of single advertisements of products which have been advertised previously. Unless the respondent is required to distinguish the test advertisements from others in the same general campaign, it is impossible to rule out the cumulative effects of similar copy. Such a correction was provided in the present study by mixing the test advertisements with control advertisements secured from advance issues of the magazine.

Quantity of data and methods of interpretation have been inadequate. Ferguson presented detailed numerical values, together with standard errors, for individual advertisements based upon interviews with 17 women. This is especially serious since the preferred positions were compared through the use of basic scores having but little greater certainty. The least number of interviews used to evaluate a fixed location in the study presented here was 320. As many as 8447 responses were used to establish the basic value of a single type of advertisement.

THE TECHNIQUE OF THE STUDY

The recognition method was used in a way which provided corrections for guessing and confusion of similar advertisements. On eleven different occasions 50 advertisements were removed from the current issue of the *Saturday Evening Post* and mixed with an equal number of physically equivalent advertisements taken from the next (future) issue. Readers of the magazine were then found by making door to door calls. Adults who stated that they had "looked into" the current issue were shown the group of 100 loose advertisements, only one-half of which could possibly have been seen previously. They were asked to cooperate by identifying the advertisements which they actually did see. The scores made by advertisements which had appeared in the various page locations were used as a measure of the position values of those particular pages. A more detailed explanation of the method is given in the following paragraphs, along with reasons for adopting some of the unusual procedures.

A preliminary investigation was conducted during three weeks of April and May, 1935. The final investigation, which

produced the data reported here, was carried on during four weeks of October, 1935, and four weeks of March, 1937. On eleven occasions it was necessary to obtain copies of the *Saturday Evening Post* from the Curtis Publishing Company in advance of the regular date of release. The control advertisements, taken from the advance issues, were marked "future" in order to distinguish them from the "current" specimens under test. Since most of the weeks of the investigation were consecutive, it often happened that "future" advertisements of one week were actually tested as "current" advertisements the following week.

Each interview set of 100 pieces contained eleven current and eleven future advertisements taken from the fixed advertising locations as already enumerated. With few exceptions, the advertisements appearing in the same fixed locations had similar physical qualities. There remained thirty-nine examples to be chosen from the run of the paper in the current issue together with an equal number from the next future issue. For this purpose a complete diagram was made each week showing the physical characteristics of all advertisements one-fourth page in size and larger. The classification included two-page advertisements, full-page in 4 colors, full-page in 2 colors, colored full-page with bleed[7] border, full-page in black-and-white, full-page in black-and-white with bleed border, one-half page (two full columns) and one-quarter page (one full column). The page number and right- or left-hand location were listed. Fortunately, and quite by accident, the number of pages in the publication remained almost constant during the time of the study.

Nearly all of the two-page advertisements were used, excepting those having different physical contents (representing different space rates) on the two pages. Practically all full-page colored advertisements were used except where they could not be matched with equivalent advertisements from the future

[7] Bleed page borders carry the printed impression over the edge of the page. This makes it possible to increase the area of the advertisement over 20 per cent.

issue. To these were added from six to ten full pages in black-and-white (some with bleed borders), and six or more each of half-page and quarter-page advertisements. Date lines and page numbers were removed from each loose advertisement as was all adjacent editorial matter. To further eliminate extraneous cues it was desirable to keep all loose advertisements face up. This required the use of two current magazine copies and two future copies to make each interview set, since some advertisements are printed on the "backs" of others. Ten current copies and ten future copies were used to prepare five complete interview sets each week.

While the advertisements from current and future issues were paired for the purpose of equalizing physical qualifications before removal from the magazine, they were not paired in the completed interview set. Instead numbers were drawn from a hat and assigned to the advertisements as they were removed from the magazines. The loose advertisements were then arranged in the serial order of the assigned numbers. There are two reasons for using the method of random arrangement. In the first place it was not desired to have the respondents attempt to choose the correct advertisement in each pair. Scores thus obtained could not be considered as direct measures of the per cent who had seen each current advertisement because each respondent would select one-half of the advertisements. In the second place it seems that respondents do not cooperate with equally sustained interest throughout the entire interview. Therefore, certain *interview positions* have a *preferred value* the same as publications have preferred advertising locations. In order to equalize the influence of interview locations for all types of advertisements a complete new assignment of numbers was made each week of the investigation. Care was also taken to prepare two-page advertisements and the fractional page sizes so as to reduce any mechanical advantages or handicaps for such sizes in the interview.

General magazines and women's magazines were checked to make sure that test advertisements were not influenced by

duplicate magazine circulation. As an added precaution a place was provided in the interview form for checking other general magazines which the respondent had seen. This led to the elimination of responses to advertisements which might have been seen elsewhere, even though the size and certain details of the make-up were sometimes different.

Experienced, specially trained interviewers made calls at homes widely scattered over the metropolitan area, including parts of New Jersey as well as Greater New York. Monday, six days after the appearance of the current issue, was the regular interview date, although some Saturday calls were made. Most of the respondents were strangers. No difficulty was experienced in getting them to begin the interview. Occasionally an interview was not completed and more frequently those who did finish remarked that the task had proved to be quite an effort. Had it been possible to secure unlimited early issues over a more extended period, the size of the interview sets could have been cut to about one-half. Under existing conditions it was desirable to use a large number of r.o.p. advertisements in order to get highly reliable scores. Thus it is possible to obtain highly reliable difference scores for the single advertisements in fixed locations with the least possible number of interviews. This seemed to justify the added burden given to each respondent.

THE AIMS UNDERLYING THE TECHNIQUE

The technique of this investigation was devised to measure the actual percentage of readers who saw any particular advertising space, without regard to the intrinsic quality of the copy. Complete attainment of that goal was prevented by at least two important factors.

1. Any recognition performance is governed by factors in addition to sensory experience (or more exposure), except where recognition equals 100 per cent of the original experience.
2. Instead of eliminating the influence of intrinsic content, a large variety of test material merely reduces that element.

Nevertheless it is believed that objectionable features of earlier studies have been greatly reduced if not actually eliminated. The natural conditions under which the readers had seen the advertisements, the representative (though localized) quality of the sample and the rigid control exercised over physical variations in the test material were important, though secondary to the distinguishing feature of the technique. This feature is the device used to account for guessing and for confusion of test advertisements with other similar copy.

The work of Rogers and Brown was referred to above as evidence that it is unsafe to assume that advertisements one year old may be practically forgotten. Because of the high recognition scores obtained with old advertisements they do not provide an adequate control for guessing on current specimens. Furthermore, in the presence of current advertisements, the respondent must get important cues owing to the obsolescence of the advertisements and the products represented. Variations in paper quality and the effects of age may also provide minor cues tending to invalidate the results. The use of advance material from forthcoming magazine issues, as described here, made it possible to turn this confusion of advertisements to advantage. If the respondent chose to guess deliberately he was as likely to lower his score as to raise it, so that it may be presumed that the average scores would remain unchanged through guessing. If the respondent was confused because of elements in the future advertisements made familiar by previous advertisements it is equally probable that he was confused by familiar elements in the current advertisements. These elements would tend to reinforce his impression and resulting score on current advertisements. They should likewise tend to increase his errors in identifying future advertisements to about the same degree. When the scores for the current advertisements have been corrected in view of errors made on future advertisements, the balance should represent the residue or impression actually made by the specific current advertisements. And when a sufficient

number of current advertisements has been used to determine an average, that average should give some measure of the impression value of the particular page location or the other physical specifications represented. The one location where this was untrue in the present study was that which was regularly occupied by the Campbell Soup Company advertisements. Even in this instance the influence of specific pieces of copy was greatly reduced, leaving only the effects of the general qualities of Campbell advertisements.

In the treatment of the data, about to be described, two definite aims may be observed which seem to be consistent with the technique proper. Having attached so much importance to the usefulness of the results for direct application, it seems desirable to avoid statistical complications in handling the data. This aim has been followed, and has been supplemented with the idea that statistical methods should be applied only where there are sufficient data.

TREATMENT OF THE DATA

Tabulation of the results was a rather simple routine, made tedious by the random arrangement of each 100 advertisements. The preliminary experiment had shown that respondents would make a definite "yes" or "no" response to almost every advertisement. This was not taken to mean that the readers were always positive, but rather that they got the idea that only their best judgment was wanted. This simple response eliminated the need for weighting of answers, together with the following attendant faults:

1. The arbitrary assignment of values.
2. The substitution of an index number where an absolute measure would otherwise be obtained.
3. Complication involved in the interpretation of the data.

Of course the respondent was allowed to indicate "can't say" when he did not wish to be positive.

Statistical treatment of the results will be found only in the correction for guessing and confusion and in the occasional

estimates of reliability of the differences found between fixed and r.o.p. locations. The correction factor is reduced to two steps as follows:

The spurious scores (identification percentages) for future advertisements were subtracted from the raw scores for current advertisements. This reduced score was then computed as a percentage of the genuine (or negative) score for future advertisements.[8] For example, the raw score for r.o.p. black-and-white advertisements was 45 per cent. Deducting the spurious influence of 20 per cent, found in future advertisements, the balance is 25 per cent. Since test conditions allowed a gain of only 80 per cent (100 per cent – 20 per cent) the balance of 25 is figured as a percentage of 80 or 31 per cent.

RESULTS

Table 1 gives a summary of the findings on the relative advantages of fixed advertising locations in the *Saturday Evening Post*. The standard errors for all fixed locations are 3 per cent while the standard errors for various types of advertisements in the run of the paper are all near to 1 per cent. Thus the standard errors of the differences which are listed are usually just over 3 per cent.

The same data are visualized in the graph, together with the proportional space cost for each type of advertisement. The cost of a black-and-white full-page advertisement is arbitrarily scaled equal in length to the identification score which black-and-white pages produced. It is evident that the scores for run-of-the-paper advertisements vary almost in direct proportion to space cost, with the exception of the two-page spreads.

[8] Note: A. C. Welch, University of Pennsylvania, has suggested an ingenious technique for making this correction in which he assumes that the percentage of guessing on unseen advertisements remains constant, whether applied before or after a part of the readers have seen the advertisements. The author sees no fault in the reasoning and would have applied the method, except that it happened to make a negligible difference as applied to the range of scores in this study while adding statistical complications. Both Welch's method and the one used above have a desirable feature in that they take some account of the differences in reliability of individual respondents.

TABLE 1

Identification Scores for Saturday Evening Post Advertisements in Fixed Locations and in Run of Paper (r.o.p.) Locations

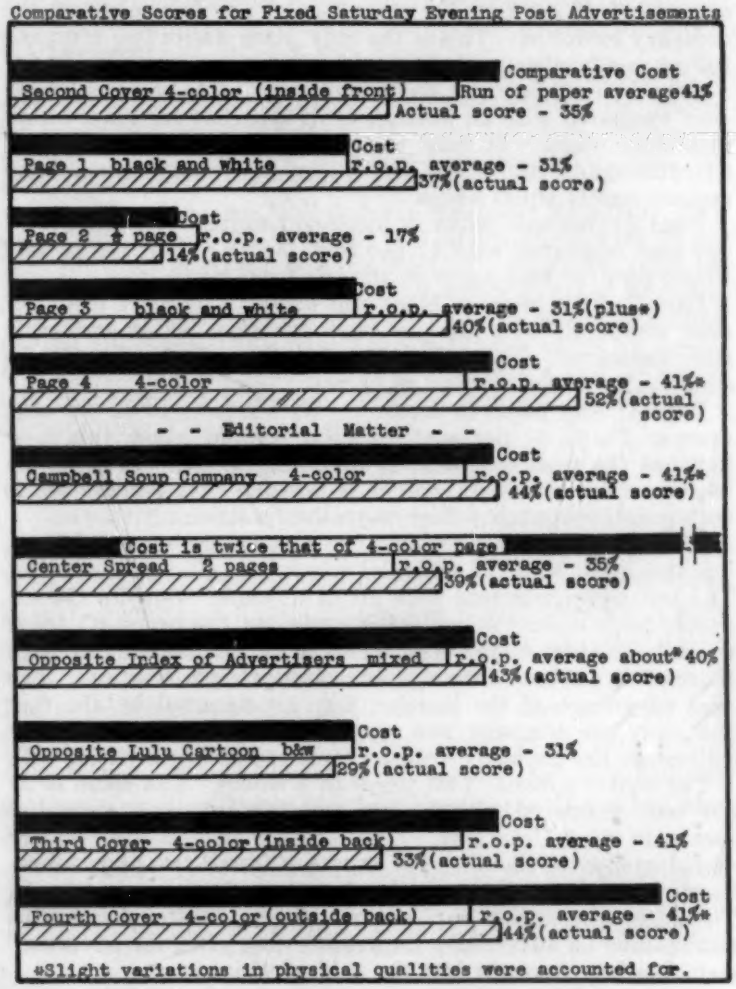
FIXED LOCATION	SCORE	AVERAGE SCORE FOR PHYSICALLY IDENTICAL ADVERTISEMENTS IN RUN-OF-PAPER LOCATIONS	ADVANTAGE OF FIXED LOCATION
	Per cent	*Per cent*	*Per cent*
Inside front cover	35	41 -full pages in 4 colors	minus 6
Page 1	37	31 -full pages, black & white	plus 6
2	14	17* -one-half pages	minus 3
3	40	31 -full pages, black & white	plus 9
4	52	41 -full pages in 4 colors	plus 11
Campbell Soup Co.	44	41 -full pages in 4 colors	plus 3
Center spread	39	35 -colored, some bleed	plus 4
Page opposite Index of Advertisers	43	40 -mixed, mostly colored	plus 3
Page opposite Lulu cartoon	29	31 -full pages, black & white	minus 2
Inside back cover	33	41 -full pages in 4 colors	minus 8
Outside back cover	44	41 -full pages in 4 colors	plus 3

* The r.o.p. score for half-pages on the left-hand side is 15 per cent, which is not significantly different from the score for page 2 (14 per cent). (Note: The comparisons made in this table are between scores for advertisements on fixed page positions and the average of all physically equivalent advertisements in the run of the paper. For example, all of the advertisements on the inside front cover were in 4 colors. Their average score of 35 per cent is compared with the score of 41 per cent which is an average for all r.o.p. advertisements printed in 4 colors. Whenever the physical qualities of advertisements in the fixed locations did vary, care was exercised to make sure that proper allowance was made in showing comparisons.)

The net advantage of the fixed or preferred locations is found by comparing the two lower bars in each group. The black bar, representing cost, was introduced specifically to show the absence of any premium on space charges for fixed locations

with the exception of the outside back cover. It is apparent that the impression values of r.o.p. advertisements in 4 colors fall a little short of justifying the added cost of color. Again excepting the outside back cover, the colored advertisements in fixed locations retained part of any advantage they had even when the extra cost of color or location is considered.

Comparative Scores for Fixed Saturday Evening Post Advertisements



VALUES OF FIXED PAGE LOCATIONS

The values found for various fixed advertising locations were as follows:

Inside front cover: All advertisements were full pages in 4 colors. The space rate is the same as for r.o.p. 4-color full pages. The recognition score is 35 per cent compared with an average of 41 per cent for other 4-color advertisements in the ordinary locations. This is the only place where two complete full-page advertisements face each other.

Page 1: Full pages in black-and-white. The score is 37 per cent compared with an average of 31 per cent for r.o.p. black-and-white pages. It may be significant that these first two advertisements, the only full pages in juxtaposition, have approximately equal scores.

Page 2: One-half pages in black-and-white. The score is 14 per cent compared with 17 per cent for r.o.p. half pages, and 15 per cent for half pages on the left-hand side.

Page 3: Full pages in black-and-white. The score is 40 per cent compared with 31 per cent for r.o.p. black-and-white advertisements. The indicated advantage of this location is statistically almost certain to be real.

Page 4: Full pages in 4 colors. With a score of 52 per cent compared with 41 per cent for r.o.p. colored pages, this location has the most conspicuous advantage of all. It faces the feature story or article, and it is possible that readers see it with greater regularity than any other position.

The Campbell Soup Co. had the first advertisement following the main body of editorial matter in all issues studied. The test advertisements were all in 4 colors. Despite the expected large correction score for confusion (34 per cent) there was a balance of 44 per cent. This is higher than the average score of 41 per cent for r.o.p. advertisements in 4 colors. The real advantage of the location may be obscured by the fact that only one company was represented. Campbell's regular patronage has probably aroused some reader curiosity as well.

The center spread: Two pages in 4 colors. The score is 39 per cent compared with 35 per cent for two-page advertisements in r.o.p. locations. The absence of editorial matter may decrease the likelihood of exposure for all two-page advertisements, and may reduce the duration of exposure as well. The latter assumption implies that editorial matter may aid in establishing an advertising impression even after the advertisement has been brought into the field of vision.

Page opposite the Index of Advertisers: Full pages which are usually in color. The score of 43 per cent is not significantly greater than that obtained as an average for r.o.p. advertisements having similar physical qualities (40 per cent). Occasionally a black-and-white advertisement appeared in this location.

Page opposite Lulu cartoon: Full pages in black-and-white. The score of 29 per cent is not significantly different from that for black-and-white advertisements in the run of the paper (31 per cent).

Inside back cover: Full pages in 4 colors. The score of 33 per cent shows a disadvantage as compared with r.o.p. advertisements in 4 colors (41 per cent). The facing page takes the reader into the editor's confidence, telling him about the authors, about the coming issue, etc.

Outside back cover: Full pages in 4 colors. This page has a slight advantage, scoring 44 per cent as compared with 41 per cent for r.o.p. advertisements in 4 colors. However, there are two factors to consider which do not apply to other locations. The extra charge for this page amounts to nearly one-third. On the other hand, this page has advertising value for people who do not get the opportunity to look inside and who were not interviewed in this test. Whether these two factors would balance each other was not revealed.

INTERPRETATION OF THE RESULTS

There were several situations in which the correction factor was high, probably because of the similarity of advertisements in campaigns of thirteen or twenty-six insertions. One tested advertisement in a fixed location was almost identical with a current outdoor poster for the same product. Another advertisement was practically the same as a soda counter card which had appeared several days beforehand. It does not seem safe to correct the scores for individual positions on the basis of such factors. There is some basis, however, for believing that a large correction factor for confusion works undue hardship on the position affected.

The reliability of the advantages found for individual fixed locations is not as high as might be desired, although nearly all of the difference values have high statistical significance.

Variations in scores from week to week were so large in some instances that the author is inclined to estimate the true chances of error somewhat higher than those calculated. Probably some of the extreme observed variations were caused by the position of certain advertisements in the interview set. Other wide deviations, including a zero corrected score for a Coca-Cola advertisement on the inside back cover, may be explained by the lack of any distinguishing copy or copy theme. Similarity to outdoor posters and counter displays could have accounted for high correction scores which practically nullified the computed recognition values in such cases. Regardless of the explanation of such wide deviations from ordinary scores, especially on the two sides of the back cover, it seems desirable that the averages should be refined still more by increased data.

Efforts by Strong and Ferguson (referred to earlier) to determine fixed location values in a single issue must have run considerable risk of extreme scores caused by factors other than advertising position. Even the use of eight issues in the present study (eleven including the preliminary work) in order to secure a reliable average score for each location may not be entirely adequate. The findings of Ferguson were based upon the "Auto Show" issue which, because of the extra incentive to interest in the advertisements, would seem to have little advantage for preferred positions. Old advertisements were used for control purposes in his study, and the number of interviews was below one hundred. The issue contained only one black-and-white full-page advertisement on the left-hand side, yet this was used to determine a base figure for left-hand position as compared with the right. The scores for women were computed on the basis of only seventeen interviews. Advertising position values were then computed for the fixed locations, each according to whether the page was on the right or on the left. In one case (for men) the difference in base scores was nearly 100 per cent. This meant that a fixed position on the left would have to have nearly twice the

score of another fixed position on the right in order to result in equal preferred value. Standard errors are included which tend to give credibility to the conclusions, although these errors in the case of women are based on but seventeen interviews. Because of the wide variations produced by individual advertisements in the present study, and because the highly reliable right- and left-hand page differences were so small, little confirmation is offered for Ferguson's work. Nevertheless his findings did much to stimulate the present study, and his technique was a helpful guide.

The average scores for run-of-the-paper advertisements in the present study have high statistical reliability. This is supported by the fact that these scores remained unchanged after the first one-third of the interviews were completed. The score with highest reliability is that for the average black-and-white full-page advertisement. The corrected value of 31 per cent is apparently a measure of actual impression resulting from circulation in the magazine. It is a minimum score in that the life of the magazine was assumed to be six (in some cases, four) days. It is possible too that many weak impressions failed to register with our technique owing to the passage of too much time before the interview. While it is the function of the medium to bring the advertisement within the visual range of the reader, it is not the primary function of the medium to intensify that impression. That responsibility falls largely upon the intrinsic and the physical qualities of the advertisement.

Errors of rationalization are apt to cloud any effort to explain the performances of individual advertisements and locations. There seems to be no doubt that the score for the back cover should be increased, since many who had not "looked into" the issue could have seen the cover. The back cover loses its most obvious advantage the moment the reader opens the magazine, as everyone interviewed for this study had done.

The presence of editorial matter seems to enhance the value of most advertising locations. This is evident not only in

the scores for two-page spreads, but in the scores for the second cover and the facing advertisement, page 1, as well. The similarity of the scores for the latter two positions, each of which has the same likelihood of exposure, suggests that the results are reliable. Most of the two-page spreads tested were colored and some had the added advantage of a bleed border. The average score of 35 per cent was hardly more than that for single pages, all of which (with the two exceptions noted) face editorial matter. Therefore, it appears that the *Saturday Evening Post* performs the double function of exposing advertisements before readers' eyes and of prolonging that exposure through the effective use of editorial matter. Again, this may be a factor working against the outside back cover.

Contrary to prevailing belief, there is really only one advertising location in the *Saturday Evening Post* which sells at a premium. There is no extra charge for any position except the fourth cover. It is true that several fixed locations cost the same as four-color locations elsewhere, but in all cases the rate includes the privilege of using four colors. Spaces of this type are the second and third covers and the center spread. Generally speaking the fixed locations are reserved for consistent users of large space. Most prominent of these has been the Campbell Soup Co. Ordinarily the pages preceding editorial matter go to advertisers having contracts for thirteen or twenty-six insertions for the year. Since ten of the fixed locations have no extra charge it was not necessary to allow for price variations in the interpretation of results for any location excepting the outside back cover. It was only necessary to make sure that the advertisements in any one fixed location were compared with run-of-the-paper advertisements having equal advantages of size, color and bleed borders. Right- or left-hand page location is not an important factor in dealing with full-page advertisements (see appendix), so was ignored in evaluating the nine fixed advertisements which occupy full pages. The other fixed advertisements were the two-page center spread and the half-page number 2. Page two was compared with other left-hand half-page spaces.

GENERAL CONCLUSIONS AND SUMMARY

Advertisements in fixed locations in the *Saturday Evening Post* have a small general advantage, and there are probably some real "preferred positions." Excepting the cover space advertisements, there is a fairly consistent advantage for the fixed locations. This may be accounted for by high reader interest in the editorial matter carried by the publication. There are several factors which have caused the author to make this observation.

1. The scores for run-of-the-paper locations were higher than the author had been led to expect, judging from his own experience and the statements of other investigators and practitioners.
2. The relative advantages of fixed advertising locations appear to be highest where they are near to the editorial matter.
3. The scores for two-page advertisements indicate that the absence of editorial matter results in great sacrifice of impression as measured by our technique.

Scores of high reliability for each individual fixed location would require from three to four times the present data. This observation is based more upon contact with the study from week to week than upon the results of statistical measures. To make such a study would require a considerable financial outlay and a more extended agreement with the publishers. A national study, representing the entire readership, would require data in proportion to its scope.

The appendix, which follows, contains data from which the following conclusions are drawn:

1. Single column (one-quarter page), two column (one-half page) and full-page advertisements (either black-and-white or four-color) have scores in almost direct proportion to their cost.
2. Women and men respond in much the same way to black-and-white advertisements, but women show a markedly greater response to color.
3. Bleed borders, judging from limited data, seem to have some advantage which may or may not equal the extra cost.
4. Right- and left-hand page locations are of about equal

value for full pages, but right-hand position is advantageous for smaller areas.

AN APPENDIX

Numerous factors indicated that our technique measured persistence or intensity of impression, a quality not entirely

TABLE 2

Identification Scores for Run-of-Paper Advertisements (Saturday Evening Post)

TYPE OF ADVERTISEMENT, POSITION AND AUDIENCE	IDENTIFICATION SCORES		
	Raw Score	Confusion and Guessing	Corrected Score
	Per cent	*Per cent*	*Per cent*
4-color, full-page (no bleeds)	55	24	41
Male			35
Female			44
Right hand			41
Left hand			40
Black-and-white full-page (no bleeds)	45	20	31
Male			30
Female			31
Right hand			31
Left hand			31
One-half page (two columns)	34	20	17
Male			15
Female			16
Right hand			17
Left hand			15
One-quarter page (one column)	24	17	8
Male			10
Female			7
Right hand			14
Left hand			4
Scores having only fair reliability			
Two-page spreads	48	20	35
2-color, full-page (no bleeds)	48	20	35
Full-page, color, bleed border	52	23	38
Full-page, black-and-white, bleed	46	20	32

determined by simple exposure of the advertisement to the reader's eye. Physical elements, other than page location, may therefore be evaluated in part by the same technique. There follow certain other data, included as an appendix, because they are only indirectly related to the main purpose of the study. Some of the figures reveal differences which are a function of the medium. Other differences represent reader variations and the physical qualities of the advertisements as indicated in Table 2. There seem to be very few important discrepancies between the findings and the corresponding price policies of the publisher. Since these data are essentially a by-product of the investigation, the reader will be left free to make his own deductions.

TESTED MALADJUSTMENT RELATED TO CLINICALLY DIAGNOSED MALADJUSTMENT[1]

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ONE of the frequent criticisms levelled at personnel work is that test data are used too mechanically or too confidently, with little attempt to go deeper than the test score. When attitude and adjustment scales are the measures used, this criticism becomes intensified. Statistically significant measured maladjustment is an untenable concept in some fields dealing with human behavior; the problem that is worrying the individual case should be the only point of departure. Students, for example, will tell the counselors that they have "an inferiority complex." If such a statement is not accompanied by a statistically significant deviate score on a specified scale, it is not thereby neglected; the average test score itself may be used to make the student realize that this problem, of absolute magnitude and concern to him, is no greater in his case than in the cases of large numbers of people. If he is still upset, other forms of therapy are tried, and it may develop that the test definition of inferiority differs from the student's definition. In such a case, statistical maladjustment is obviously an inadequate concept.

However, when scale scores and diagnoses are found to correspond, statistical maladjustment is a workable and valuable approach to behavior problems. The present data are interest-

[1] These data are taken from "An Analysis of Attitude and Adjustment Tests with Special Reference to Conditions of Change in Attitudes and Adjustments," by John G. Darley—a Ph.D. thesis on file at the Univ. of Minnesota Library. Professor D. G. Paterson was the author's major advisor.

ing in that they shed some light on the conflict between techniques for measuring relative maladjustment, and techniques giving importance to any problem that upsets an individual.

During the academic year 1935–1936, 326 men and 217 women in the General College at the University of Minnesota were tested and retested over an average interval of 9.2 months, on the following attitude and adjustment scales: the Minnesota Scale for the Survey of Opinions;[2] the Adjustment Inventory,[3] and the Minnesota Inventories of Social Attitudes.[4] These schedules yield twelve attitude or adjustment scores. The Minnesota Scale for the Survey of Opinions is scored for: morale; inferiority feelings; family adjustments; attitudes toward the law; economic conservatism; attitudes toward education. The Adjustment Inventory is scored for home, health, social and emotional adjustments. The Minnesota Inventories of Social Attitudes yield a separate score for social preferences and social behavior.

These tests covered about one and one-half hours of a four to five hour basic testing program for clinical counseling services in the college. Ability, aptitude, interest and achievement tests were also given in the first testing program. During the year, two counselors made an average of four contacts with approximately 800 students. These contacts provided the clinical interview data on which case analyses were based.

Since test scores were present in almost every case in these data, no opportunity is provided for validating tests against independent diagnoses. But the data may provide some answer to this question: were diagnoses completely determined by test scores available during the interview, or were the counselors

[2] Rundquist, E. A., and Sletto, R. F.: *Scoring Instructions for the Minnesota Scale for the Survey of Opinions*, Univ. of Minnesota Press, 1936.

[3] Bell, H. M.: *Manual for the Adjustment Inventory*, Stanford Univ. Press, 1934.

[4] Williamson, E. G., and Darley, J. G.: *Manual for the Minnesota Inventories of Social Attitudes*, The Psychological Corporation, New York City, 1937.

able to go beyond test scores and make judgments on less immediately obvious data? Another question might be as follows: in what proportion of the cases were test scores important clues to diagnoses?

After the close of the school year, all cases were analyzed by the two counselors, in terms of presence or absence of the specific problems listed by Williamson and Darley.[5] In addition, these sixty to seventy specific problems were grouped in the following problem areas: financial; educational; vocational; social-emotional-personal; family, and physical or health. In the case analysis, a judgment was made as to whether a problem area was of "major" significance in the individual case, "present," but not "major," or completely absent. In cases of insufficient data, cases were classified in a category of "no case analysis possible" and eliminated for the present study.

Students who were diagnosed as having major family and/or social-emotional-personal problems were selected as one group for study.

Specific problems within these areas are as follows:

Social-Emotional-Personal

1. Personality traits hampering life or job adjustment.
2. Inappropriate socialization—over-socialization.
3. Inappropriate socialization—under-socialization.
4. Psychotic (or neurotic) symptoms.
5. Feelings of inferiority—lacking in self-confidence.
6. Lack of morale.
7. Psychiatric referral.
8. Sex conflict.
9. Lack of social skills.
10. Dislike of campus life.

Family

1. Sibling conflict.
2. Split-family situation.

[5] Williamson, E. G., and Darley, J. G.: *Student Personnel Work: An Outline of Clinical Procedures.* McGraw-Hill Book Company, New York, 1937. 313 pp.

3. Overdependence on student's part.
4. Difficult transition to independence (student or parents).
5. Serious family conflict over:
   a. educational/vocational plans.
   b. finances.
   c. personality adjustments.
   d. religion.
   e. difference in standards (social, recreational or economic).

Another group was composed of students having statistically significant deviate scores on selected scales that might relate to these two problem areas. Two sets of data were summarized: the percentage of statistically maladjusted cases on selected scales who were also diagnosed as having major family and/or social-emotional-personal problems (Table I); the percentage of cases diagnosed as having major family and/or social-emotional-personal problems who also had statistically significant deviate scores on selected tests (Table II).

Quite obviously, from Table I, the presence of a statistically significant deviate score does not uniformly lead to a diagnosis of a major problem in the areas under investigation. In the case analysis, a statistically significant deviate score alone, without supporting interview evidence, was not considered sufficient evidence to warrant a judgment of a "major" (or "minor") family and/or social-emotional-personal problem. So, such discrepancies between deviate scores and diagnoses as appear in Table I are due in part to interview evidence not corroborative of measurement evidence. The following three examples describe this situation.

In some instances, interview probing of a measured maladjustment led to a flat denial by the student of the presence of such a problem. If further probing from other angles failed to elicit any evidence of a problem, or if the flat denial did not itself seem to be a defense mechanism, the counselors were forced to assume that the scale score was clinically meaningless for that student. In other instances, interview data substan-

TABLE I

Number of Students with Statistically Significant Deviate Scores on Selected Scales, Compared to Number of Such Students Diagnosed as Having Major Family and/or Social-Emotional-Personal Problems

SCALE	ALL STUDENTS WITH DEVIATE SCORES		NUMBER OF SUCH STUDENTS DIAGNOSED		PERCENTAGE OF SUCH STUDENTS DIAGNOSED	
	Men	Women	Men	Women	Men	Women
RUNDQUIST-SLETTO:						
Inferiority	26	19	11	11	42.3	57.9
BELL:						
Social	44	19	16	12	36.4	63.2
Emotional	43	31	21	11	48.8	35.5
SOCIAL PREFERENCES	96	60	23	18	23.9	30.0
SOCIAL BEHAVIOR	45	25	15	10	33.3	40.0
RUNDQUIST-SLETTO:						
Family	47	23	20	9	42.5	39.1
BELL:						
Home	73	40	24	16	32.9	40.0

tiated measurement data, but for an individual student, in the light of his total problem constellation, the specific problem area was judged to be minor, or merely present, rather than major. In additional instances, the counselors noticed the statistically significant measurement evidence, but since the student might be primarily concerned with program-planning, or transfer, or other routine problems, apparent family and/or social-emotional-personal problems had to be postponed to another interview, for which the student did not always return.

These data are in no way presented as evidence for the validity of the scales, but simply as indications of their utility in a personnel service program. Discounting for the moment cases where interviews yielded no substantiating data regarding significant deviate scores, Table I indicates essentially that, while the scales give clues to the presence of problems, the clinician must still evaluate the measurement evidence in relation to the total picture of the individual student. Whereas the scales may indicate the presence of a home, a health, and an inferiority problem in the same student, the counselor must determine which, if any, is immediately most important. Conversely, of course, the student, in reacting to the scale items, is stating his own impression of the problem, and while this self-estimate may represent a statistically significant deviation from the norm, the clinical interview situation might indicate that less importance should be attached to a given deviate score.

One generalized conclusion that may be drawn from the data in Table II is fairly obvious: of all the counselors' diagnoses of major family and/or social-emotional-personal problems, the selected scales are identifying on the average 37 per cent and 30 per cent of such problems among men and women, respectively. The diagnoses are not solely dependent upon the tests in these problem areas. This conclusion does not, however, bear upon the validity of either the scales or the diagnoses because of certain definite limitations or conditions of this study, which contribute indeterminate parts of the discrepancies between diagnoses and measurement.

In the first place, how often will students "cover up" in purposely or unconsciously giving answers that are not true statements about a problem or attitude? In general, errors of measurement of this kind are probably small, but in the individual case such an error may interfere with the clinical analysis. In a few cases, students have admitted falsifying answers, either because they felt it was "none of your (the College's) business" or because of doubt as to the consequences of a true response. These same students, however, would discuss their problems freely in the interview setting and might even, upon retesting, make a score more nearly representative of the status of a specific problem, with the retest score being actually higher than (worse than) the test score. This factor of "covering up" contributes some part of the difference between diagnoses and measurement in the specified problem areas.

In the second place, a statistically significant deviate score grows out of the additive effect of many individual test items, whereas an individual student may be excessively concerned about small items of behavior or a few specific problems. The student, either in an interview or in a test situation, is making an *absolute* self-estimate, with no concept of the "normal" or "average" amount of adjustment and maladjustment found in people in general. This situation presents an unavoidable error of measurement that can only be adjusted clinically. It occurs quite frequently, for example, in family problems. A student knows he is "having trouble" at home, but the aura of sanctity surrounding the family as a social institution prevents him from realizing that nearly all students "have trouble" at home at some point in their development. Only when the counselor points out the frequency or common nature of such problems can the student see his own situation in relation to other students. In this same way any one item in a scale or questionnaire may, as has been mentioned, be a major source of concern to an individual student, where most of the other items relative to the same area of behavior are of little importance to him. For example, students were identified in

TABLE II

Number of Students Diagnosed as Having Major Family and/or Social-Emotional-Personal Problems, Compared to Number of Such Students Who Also Had Statistically Significant Deviate Scores on Selected Scales

SCALE	NUMBER OF STUDENTS DIAGNOSED		NUMBER OF SUCH STUDENTS WITH DEVIATE SCORES		PERCENTAGE OF SUCH STUDENTS WITH DEVIATE SCORES	
	Men	Women	Men	Women	Men	Women
RUNDQUIST-SLETTO:						
Inferiority	54	51	11	11	20.4	21.6
BELL:						
Social	56	51	16	12	28.6	23.5
Emotional	56	51	21	11	37.5	21.6
SOCIAL PREFERENCES	54	51	23	18	42.6	35.3
SOCIAL BEHAVIOR	54	51	20	17	37.0	33.3
RUNDQUIST-SLETTO:						
Family	45	35	20	9	44.4	25.7
BELL:						
Home	46	35	24	16	52.2	45.7

interviews who were intensely worried over their inability to talk easily in classroom situations, and dreaded being called upon for a recitation. Items relative to this kind of behavior appear in the attitude or adjustment scales, among other items pertaining to social skills or adjustments, but the student might be otherwise measurably well-adjusted, with only the serious worry over the classroom speech situation. Other students might be overly concerned about getting angry easily, or consider themselves excessively nervous, yet still make an average or better score on the total scale for emotional adjustment in which these items appear. Even when a given scale includes items regarding a student's problems, he may answer positively only these specific items, responding neutrally to other items in the same scale. The total result of measurement in such cases is an apparently satisfactory adjustment from the normative standpoint, even though a problem does exist in the student's absolute, or non-relative, judgment.

In the third place, the present measuring instruments are not specifically directed at all possible maladjustments in the family or social-emotional-personal areas. From the specific problems listed earlier in this paper, a few such instances are immediately observable. A student who intensely dislikes campus life and who remains in school only because his parents wish it may be faced with a major social problem not covered by the various tests. The student whose religious outlook borders on fanaticism faces a major social and emotional problem if he steps out of the extremely small circle of like-minded individuals.

One girl, for whom all 12 scales indicated satisfactory adjustment, proceeded to have a "nervous breakdown" necessitating complete removal from school. This situation was foreseen by the counselors partly in the girl's intensely religious outlook, but could not be prevented. Sibling conflicts were occasionally judged, from interview data, to be major problems, without corroborative test evidence on this specific phase of adjustment. This was also true of sex problems.

As a corollary to this third factor, it is equally obvious that students would be completely unaware of some problems that the counselors could see in them. The over-dependent student, prefacing all remarks with "mother says" or "father says," has not even started the normal transition to independence that might be expected in students of this age. The student trying to establish his status as an individual in the face of powerful but subtle family resistance is also in this category. The student who comes to accept as normal extreme family domination is still another example. The student who has developed traits of bragging, cockiness or bad manners, may in the counselor's judgment be hampered in a life or job adjustment until these traits are modified. In each of these cases, the students themselves are unaware of the problem, and the scales consequently may not identify the difficulty in a statistically significant deviate score.

Each of the factors mentioned has contributed some part of the discrepancies in the relation between diagnosed major problems and statistically significant deviate scores in the same students. The factors may be pertinent only to the personnel service program in which these data were collected. Actually, personal problems of the family and social-emotional-personal type were seldom the reasons for counseling interviews. The counselors came to be identified, in the students' thinking, with problems of transfer, educational or vocational advising, and administrative details. For this reason, it is probable that the number of diagnosed major family and/or social-emotional-personal problems appearing in Table II is not a true representation of the actual number that might be found in a more intensive personnel program.

In another sense these limiting facts are quite definitely related to the basic, but not insoluble, conflict between the psychiatric or strictly clinical approach to human behavior and the measurement or normative approach. From the counselors' standpoint scales that provide clues to specific adjustment problems in 30 to 40 per cent of the cases are tremendous labor-

saving aids in a large-scale personnel program, even though some problems may not be touched by the scales. The scales that do exist still need interpretation and clinical judgment in their use; in behavior areas where scales do not exist, straight clinical judgments alone must be used until scales are devised. Advances in measurement will intensify, rather than limit, the need for clinical skill, at the same time as they broaden the scope of personnel work. When the psychiatrist sees such measurement as aids rather than absurdities, and if he is obliged to temper his absolutism with a normative outlook on behavior problems, part of the conflict may disappear. Conversely, when personnel workers learn to interpret massed statistical and normative evidence with clinical skill, rather than mechanically, for the individual case, in the light of all aspects of adjustment, another barrier to closer cooperation will be removed.

A COMPARISON OF METHODS OF ITEM SELECTION FOR A PERSONALITY TEST

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IN the construction of any mental test, item validation now plays an important part, and there exist a great many methods for item validation. Recent studies dealing with intelligence and achievement test items have been made by Swineford,[1] by Smith,[2] and by others. Long and Sandiford,[3] have made a most comprehensive survey of previous studies in this field and have presented additional experimental evidence concerning the performance of various methods of item analysis.

In all probability the conclusion concerning the efficacy of various methods of item validation in the sphere of intelligence and achievement test construction may also apply to the field of personality test construction. Lentz, Hirshstein and Finch[4] experimentally evaluated four methods of selecting items for a questionnaire on conservatism. Of the four methods employed, namely, The Upper vs. Lower Third Method, The Overlapping

* The authors wish to acknowledge the help rendered by the U. S. Works Progress Administration, New York City, and in particular to thank Mr. Salvatore Mantione and Mr. S. Ochoco, who were responsible for most of the statistical computations.

[1] Swineford, F. Validity of Test Items. J. Educ. Psychol., 1936, 27, 68–78.

[2] Smith, M. The Relationship between Item Validity and Test Validity. Contributions to Education, No. 621, Teachers College, Columbia University, 1934.

[3] Long, John A. and Sandiford, P. The Validation of Test Items. Bulletin No. 3, Dept. of Educ. Res., University of Toronto, 1935.

[4] Lentz, T. F., Hirshstein, B. and Finch, J. H. Evaluation of Methods of Evaluating Test Items. J. Educ. Psychol., 1932, 23, 344–350.

Method (Vincent), The McCall Method (Long's Modification) and the Summation of Agreements Method (Lentz), the authors found the first method, The Upper vs. Lower Third Method, to be the best, that is, the one giving the greatest increase in the reliability of the questionnaire.

It is the concern of this short paper to compare nine methods of selecting reliable and valid items for a personality inventory. It was our purpose to select those items which correlated highly with the scores on the test as a whole, in other words, those items, which made for high internal consistency.

THE METHODS

The nine methods of item selection discussed herein are as follows:

1. Bi-serial r
2. McCall-Long-Bliss Method
3. Clark's Method
4. The Upper vs. Lower 27 Per Cent
5. The Overlapping Method (Vincent)
6. Long Weighted Overlapping
7. McCall's Method
8. Critical Ratio Method
9. Boas-Yulean Phi

There is no space in this article to describe all these methods. Most of them are familiar to most workers. A full description can be found in Long and Sandiford's report except for method 9 which is described in Kelly, T. L. Statistical Method. New York, The Macmillan Co., 1924, p. 259.

THE TEST

The test employed was the experimental edition of the Personality Test.[5] This edition consisted of four sub-tests as follows: Introversion-Extroversion (I–X) with 68 items, Ascendance-Submission (A–S) with 76 items, Inferiority-Superiority

[5] Pintner, R., Loftus, J. L., Forlano, G. and Alster, B. Aspects of Personality Test. For Grades IV to IX. The World Book Co., Yonkers, N. Y., 1937.

(S–I) with 82 items, Emotionality (E) with 72 items. The population dealt with comprised two samples of one hundred cases each. The first sample was made up of children in grades IV to VI; the second of children in grades VI and VIII.

THE PROCEDURE

The best 35 items for each of the four sub-tests were selected by each of the nine methods of item analysis. The papers were then scored for each of these sets of 35 items. In this way there were nine scores for each child based upon the nine different sets of the best thirty-five items as selected by the nine different methods of item analysis. The inter-correlations of these nine different scores were then computed and they show the degree of similarity or difference in picking out the best thirty-five items of the nine methods of item analysis. Table I shows the inter-correlations thus obtained for the 35 best items for the sub-test of Superiority-Inferiority for the first sample of one hundred cases. The last column gives the mean of all the inter-correlations for each method. The method which correlates highest on the average with all the other methods is Bi-serial r, for the sub-test for this sample.

In the same way tables (not reproduced here) were prepared for each of the other sub-tests for each of the two samples. There were, thus, two tables for each of the four sub-tests, that is, eight tables of correlations for the best thirty-five items.

Similarly the worst thirty-five items and the intermediate or middle thirty items were treated in the same way. There were thus, twenty-four tables of correlations in all, eight for each of the three sets of items: best, middle and worst.

If now we take the mean correlation of any one method with all the other methods, we can consolidate all these twenty-four tables into three. Tables II, III and IV show these mean correlations for each of the four sub-tests for each of the two sample populations for the best, middle and worst items respectively. It will be noted that these mean correlations for the best items are in general fairly high, most of them being above

TABLE I

Correlations of the Scores Based on the Best 35 Items

Sub-Test. Superiority-Inferiority

METHODS	1	2	3	4	5	6	7	8	9	MEAN
1. Bi-serial r		.987	.978	.974	.981	.974	.939	.974	.974	.973
2. McCall-Long-Bliss			.987	.947	.967	.947	.941	.947	.947	.959
3. Clark				.947	.960	.947	.952	.947	.947	.958
4. Upper and Lower 27%					.960	.946	.925	.946	.946	.949
5. Vincent Overlapping						.952	.932	.952	.952	.957
6. Long Weight Overlapping							.960	.971	.971	.959
7. McCall								.952	.952	.944
8. Critical Ratio									.942	.954
9. Boas-Yulean Phi										.954

TABLE II

*Mean Correlations for the Best 35 Items of Each Sub-Test**

METHODS	SECOND HUNDRED				FIRST HUNDRED			
	A–S	S–I	I–X	E	A–S	S–I	I–X	E
1. Bi-serial r	.912	.952	.929	.958	.838	.973	.879	.954
2. McCall-Long-Bliss	.928	.963	.933	.975	.851	.959	.909	.957
3. Clark	.937	.956	.910	.978	.866	.958	.868	.974
4. Upper vs. Lower 27%	.929	.957	.939	.974	.825	.949	.892	.966
5. Vincent Overlapping	.910	.971	.913	.977	.853	.957	.880	.978
6. Long Weighted Overlapping	.931	.951	.919	.973	.873	.959	.854	.970
7 McCall	.939	.936	.932	.982	.892	.944	.891	.979
8. Critical Ratio	.945	.948	.924	.981	.886	.954	.889	.974
9. Boas-Yulean Phi	.921	.948	.916	.975	.860	.954	.900	.972

* (A–S)—Ascendance-Submission. (S–I)—Superiority-Inferiority. (I–X)—Introversion-Extroversion. (E)—Emotionality.

TABLE III

Mean Correlations for the Middle 30 Items of Each Sub-Test

METHODS	SECOND HUNDRED				FIRST HUNDRED			
	A–S	S–I	I–X	E	A–S	S–I	I–X	E
1. Bi-serial r	.777	.894	.841	.916	.936	.836	.743	.954
2. McCall-Long-Bliss	.814	.879	.858	.958	.792	.891	.815	.959
3. Clark Method	.769	.854	.816	.955	.771	.857	.732	.954
4. Upper vs. Lower 27%	.804	.902	.847	.955	.770	.875	.769	.962
5. Vincent Overlapping	.815	.871	.802	.953	.725	.839	.751	.946
6. Long Weighted Overlapping	.854	.839	.863	.954	.826	.869	.798	.957
7. McCall Method	.799	.880	.847	.958	.826	.883	.785	.969
8. Critical Ratio	.828	.887	.803	.957	.787	.883	.769	.960
9. Boas-Yulean Phi	.786	.839	.776	.957	.809	.841	.619	.944

TABLE IV

Mean Correlations for the Worst 35 Items of Each Sub-Test

METHODS	SECOND HUNDRED				FIRST HUNDRED			
	A–S	S–I	I–X	E	A–S	S–I	I–X	E
1. Bi-serial r	.691	.815	.611	.930	.775	.804	.771	.932
2. McCall-Long-Bliss	.718	.831	.732	.947	.767	.879	.823	.926
3. Clark	.777	.840	.688	.933	.809	.843	.738	.923
4. Upper vs. Lower 27%	.744	.837	.782	.932	.800	.858	.793	.913
5. Vincent Overlapping	.777	.827	.782	.946	.817	.860	.746	.918
6. Long Weighted Overlapping	.784	.831	.770	.928	.831	.887	.759	.902
7. McCall	.803	.836	.797	.937	.800	.844	.836	.911
8. Critical Ratio	.806	.838	.705	.941	.791	.881	.803	.928
9. Boas-Yulean Phi	.725	.835	.773	.922	.729	.868	.774	.912

TABLE V

Mean Correlations for All Sub-Tests

METHODS	SECOND HUNDRED						FIRST HUNDRED					
	Best 35		Worst 35		Middle 30		Best 35		Worst 35		Middle 30	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1. Bi-serial r	.938	9	.762	9	.857	7	.911	8	.821	8.5	.867	1
2. McCall-Long-Bliss	.950	2	.807	8	.877	2.5	.919	4	.849	2	.864	3
3. Clark	.945	5	.810	7	.849	8	.917	5.5	.828	7	.829	7
4. Upper vs. Lower 27%	.950	2	.824	4	.877	2.5	.908	9	.841	5	.844	6
5. Vincent Overlapping	.943	7	.833	2	.860	6	.917	5.5	.835	6	.815	8
6. Long Weighted Overlapping	.944	6	.828	3	.878	1	.914	7	.845	4	.863	4
7. McCall	.947	4	.843	1	.871	4	.927	1	.848	3	.866	2
8. Critical Ratio	.950	2	.823	5	.869	5	.926	2	.851	1	.850	5
9. Boas-Yulean Phi	.940	8	.814	6	.840	9	.922	3	.821	8.5	.803	9

.9. In general, we may say that the best items chosen by any of these methods yield approximately similar scores. No one method gives consistently the highest correlation for all four sub-tests in the two sample populations. The McCall Method ranks highest three times, more often than any other one method.

A study of Tables III and IV shows that the correlations for the middle thirty and worst thirty-five items are not as high as those for the best thirty-five items. Again in these tables there is no one method which consistently shows the highest inter-correlations. The Long Weighted Overlap ranks highest more frequently than any other single method.

Table V shows the means of the correlations for all four sub-tests for the two populations. The correlations have been ranked from highest to lowest. There is very little consistency in these ranks and not very much difference between the highest and the lowest correlation in any one column. The McCall method ranks first in two out of the six comparisons. For choosing the best items and the three methods showing the highest correlations for one population are the McCall-Long-Bliss, the Upper-Lower 27 Per Cent and the Critical Ratio; and for the other population the McCall, the Critical Ratio and the Boas Yulean Phi. Similarly if we study the ranking of the methods for the choice of the middle or worst items, we again find no one method showing consistently the highest mean correlations.

INTERCORRELATION OF VALIDITY VALUES

The validity values assigned to each item by each of the nine methods have been correlated with each other. These inter-correlations show to what extent the various methods agree in their rating of the test items. Tables of inter-correlations for each of the four sub-tests for one sample population have been prepared. These are too lengthy to be reproduced here. In general these correlations are not very high. Table VI shows the means of these inter-correlations for each of the nine methods for each sub-test. These correlations are in general all

TABLE VI

Mean Inter-Correlations of Validity Values

METHODS	A–S	S–I	I–X	E
1. Bi-serial r	.576	.829	.694	.767
2. McCall-Long-Bliss	.761	.885	.760	.863
3. Clark	.620	.752	.740	.830
4. Upper vs. Lower 27%	.678	.752	.810	.872
5. Vincent Overlapping	.617	.727	.760	.629
6. Long Weighted Overlapping	.563	.788	.784	.883
7. McCall	.732	.694	.773	.842
8. Critical Ratio	.732	.859	.646	.866
9. Boas-Yulean Phi	.663	.823	.733	.879

substantial, but not nearly so high as those based upon the scores as we have seen above. Evidently the various methods differ considerably as to the relative values assigned to the best items, as selected by these different methods, as we have seen in the previous paragraph, there is very little difference in the resultant total scores in a given population.

SUMMARY

A comparison of nine methods of item selection for a personality test has been made. This comparison has made use of four sub-tests and two populations of one hundred cases each. The methods of item selection have been compared on the basis of the scores obtained by the items selected by each method. This has been done for the best 35, the middle 30 and the worst 35 items respectively. Scores based upon its items selected by the nine methods show very high inter-correlations particularly with reference to the best items. It would seem to make little difference, therefore, in actual practical work as to which method of item selection is used in the selection of the best (most consistent) items for a sub-test in the construction of a personality test of the inventory type.

A further comparison of the nine methods has been made by correlating the validity values assigned to all the items by the nine methods. Again we note a fairly high agreement among the various methods in the assignment of such validity values.

MEMORY FOR TRADE NAMES PRESENTED IN SCREEN, RADIO AND TELEVISION ADVERTISEMENTS

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INTRODUCTION

THE present study represents a laboratory check upon the author's previous field studies demonstrating with large numbers of subjects that advertising material results in better attention and memory when presented by certain visual-auditory or auditory modes than when presented by certain visual modes.

In one[1] study a group of 92,681 Indiana high school seniors made an attention-inquiry response seven times as frequently, in proportion to population, when they were given combined visual and auditory stimulation (literature and speaker) as when they were given simple visual (literature) presentation. These same subjects made the action or enrollment response twice as frequently following visual-auditory presentation as following simple visual presentation.

A later[2] field investigation with 25,443 Indiana State Fair visitors showed that 19.9 per cent of them gave attention to an exhibit with no accompanying advertising, 25.4 per cent with accompanying poster advertising, 32.1 per cent with radio advertising, and 33.4 per cent with poster and radio advertising combined in a mode regarded comparable to television. Likewise, memory for the exhibit was found to be least with no

[1] Elliott, Frank R. Visual vs. Social Stimulation in a Go-To-College Program. Ms. Indiana University Library. 1934.

[2] Elliott, Frank R. Eye vs. Ear in Advertising. *Sales Management*, 1935, 36, 196.

accompanying advertising, better with poster advertising, far better with television (poster and radio), and even slightly better with radio alone.

The enormous number of subjects in field studies such as these offers a real basis for reliability, since the variables other than that of mode tend to cancel each other in what the author has termed an *Equilibrium of Canceling Variables.*[3] There is freedom from the artificiality of laboratory situations but there is also lack of those controls which the laboratory gives. The advantages of taking the problem from the field into the laboratory for further study is obvious.

MATERIALS AND PROCEDURE

Materials of the laboratory study consisted of 36 fictitious advertisements averaging 22 words in length and covering the more commonly used commodities of everyday life such as foods, home furnishings and wearing apparel, of which the following are examples:

Streamline Automobile

Trimmed true from stem to stern.
Built low. Fast. Safe. Comfortable.
Make speed safe in a new
Streamline Automobile.

Poland Lamps

For your home. You will have to
see these new lamps to appreciate
them. See our new line of
Poland Lamps.

An effort was made to avoid disturbing variables in copy such as display effects, white space, size, position. Underscoring and capitalizing the trade names were the only methods of emphasis. Typewriter type was used. The advertisements were photographed on film and shown one at a time on a Translux screen by means of a Delineascope Model 1 projector

[3] Elliott, Frank R. Memory for Visual, Auditory and Visual-Auditory Materials. *Arch. Psychol.*, 1936, No. 199.

for visual presentation. The advertisements were read by a radio announcer over a small public address system for auditory presentation. The advertisements were shown on the screen and spoken over the radio simultaneously for the visual-auditory or television mode of presentation.

Eighteen of the 36 advertisements were descriptive of the product and had descriptive trade names, while the other eighteen were non-descriptive. *Streamline automobile* is an example of the descriptive trade name, while *Poland lamps* is an example of the non-descriptive type of trade names used.

Eighteen advertisements were presented in complete form on the screen and 18 were broken up and presented in serial form as in the following example:

Part One: *Restwell Mattress.*
Part Two: For the rest of your life. All tired out? Needing a perfect night's rest?
Part Three: Then go to bed on a *Restwell Mattress.*

Since opportunity for grouping or review has been held by some authors to be an inherent advantage of visual mode, the breaking up of the advertisements was designed to test this theory.

Recall and recognition tests were run, one-half visually and one-half orally rather than entirely by visual mode under the traditional procedure. Further, the score sheets contained nothing but numbers, in order to avoid opportunity for review which exists when commodity names are listed on a sheet in aided recall and real and fictitious items in recognition tests.

Subjects were divided into two groups of three sections each. Group X consisted of 67 Federal government relief workers in New York City who in 1934–35 were doing clerical work for Teachers College, Columbia University. The group included 38 men and 29 women. Members of the three sections of the group were equated as closely as possible for intelligence, sex and age, as follows:

	Section 1	*Section 2*	*Section 3*
Av. Age in Months	416.86	426.06	425.00
Av. CAVD Score	410.16	411.07	410.62

Group Y consisted of 76 Columbia University Extension class students in New York City, 38 men and 38 women. The average age of Group Y was about ten years less than that of Group X. The intelligence of Group Y was presumed to be greater than that of Group X, though no actual intelligence test of Group Y was made. Group Y was better educated than Group X, although 75 per cent of the latter stated that they at some time had attended college.

The reason for dividing Group X and Group Y each into three sections was to establish a triple rotation order for the presentation of materials as follows:

TABLE 1
Rotation Schedule

SETS OF ADVS.	SUBJECTS OF SECTION ONE	SUBJECTS OF SECTION TWO	SUBJECTS OF SECTION THREE
Nos. 1–12	Poster	Radio	Television
Nos. 13–24	Radio	Television	Poster
Nos. 25–36	Television	Poster	Radio

The object of this rotation order was to equalize practice effects, position advantages, novelty values, differences in difficulty of materials, and differences in memory ability of the subjects. Thus, differences of association value of the trade names were distributed equally over the three modes and among the three sections in the horizontal plane, while differences in memory ability of the subjects were distributed evenly over the three modes and the three groups of materials in the vertical plane.

Attention is called to the incidental nature of the memory tests. The subjects were not informed in advance that this was to be a memory test. They were asked merely to classify each advertisement, on the basis of its trade name and its content, as (1) Descriptive or (2) Non-Descriptive. This was

designed to assure careful attention to each advertisement as it was presented and also to mask the memory tests to follow and so make the experiment more like the life situation than would have been the case had the subjects been informed in advance that memory tests were to follow. The concealment of the memory tests was so complete that not even trained psychologists who took the tests realized that recall and recognition data were to be gathered.

STEPS IN TESTING

Subjects were brought into the experimental room which had been darkened sufficiently to permit clear screen presentation and yet not so dark that they would have difficulty in marking their score sheets. When subjects had been seated in the seats of their own choice, descriptive vs. non-descriptive score sheets were passed out and instructions at the top of the sheets were read by the experimenter. Any questions which the subjects had were answered by the experimenter; subjects were given opportunity to find seats giving a good, clear view of the screen. Preliminary tests had been run to determine the intensity of light on the screen and the volume of the loud speaker setting necessary to provide as nearly as possible the optimum of clear reception for either mode.

The experimenter, seated at his table at the front of the room adjacent to the loud speaker, called out: "No. 1." The projector operator concealed from view back of the screen presented the first advertisement on the screen and held it there for ten seconds (stop watch timing by the experimenter) until the experimenter said: "Score." The subjects then looked down at their score sheets and placed a check mark in the blank space marked 1 in the descriptive or non-descriptive column, depending upon their judgment. At the end of five seconds for scoring, the experimenter proceeded to No. 2 and so on through the series by visual mode. When the visual series had been completed (12 items), the experimenter, without a break in timing, called for No. 13 by auditory mode. This was accomplished by pressing a button which operated a buzzer in

the announcer's room. This was his signal to begin reading the next advertisement; once completed, he waited for the next buzzer signal five seconds later to start the second advertisement and so on. For the television series beginning with Advertisement No. 25, both the screen and the radio presentation came on simultaneously. For the second section of subjects the order of presentation was changed as indicated in Table 1.

When the presentation series had been completed, the experimenter passed out the recall score sheets, read the instructions for scoring carried at the top of each sheet, and, following any questions, proceeded to announce the number of the first item and immediately thereafter to present the commodity name by screen or by radio as called for in the presentation schedule. Fifteen seconds were allowed for subjects to write in the trade name; then item two was announced and so on. When the series had been scored for recall, E presented the recognition series, with a time allowance of five seconds for the checking of each item as plus, minus or ? according to whether it was recognized as real, fictitious or doubtful. Thirty-six fictitious trade names were mixed at random with the 36 real trade names.

RESULTS

Table 2 shows the results for mode of presentation for four different groupings of the data: No. 1—All of Group X and Sections 1 and 3 of Group Y; No. 2—All of Groups X and Y; No. 3—All of Group X only; No. 4—All of Group Y only. These groupings give opportunity for direct comparison of Groups X and Y with each other and with both groups combined. Such grouping also provides for the elimination of Section Two of Group Y, an analysis which seems advisable in view of the fact that experimental conditions were faulty for this section and since the elimination of Section Two merely reduces the size of the numbers participating.

Under the exigencies of the experimental set-up and in view of the difficulties of obtaining time of subjects from their class work at Columbia University, it was necessary in the case of

TABL

Memory for Trade Names Presented by Screen

ROWS		Col. 1				Col. 2			
		AIDED RECALL				†CRUDE RECOGNITION FREQUENCY			
1	*Experimental Situation	1	2	3	4	1	2	3	4
2	Number of Subjects	105	127	57	70	119	141	66	75
3	Screen Average	1.61	1.87	1.47	2.20	7.07	7.37	7.05	7.65
4	Radio Average	2.15	2.05	2.02	2.07	8.18	8.14	7.86	8.39
5	Television Average	2.30	2.45	2.15	2.70	8.71	8.70	8.56	8.81
6	Screen Sigma	1.59	1.77	1.58	1.84	2.40	2.43	2.33	2.49
7	Radio Sigma	1.42	1.40	1.51	1.30	2.26	2.25	2.50	1.95
8	Television Sigma	1.75	1.75	1.59	1.82	2.21	2.14	2.27	2.07
9	Screen Sigma Average	.155	.157	.209	.220	.220	.205	.287	.288
10	Radio Sigma Average	.139	.124	.200	.155	.207	.190	.308	.225
11	Television Sigma Average	.170	.155	.210	.217	.203	.180	.280	.239
12	Correlation: Screen vs. Radio	.50	.43	.52	.38	.37	.32	.49	.13
13	Correlation: Screen vs. Tel.	.62	.62	.69	.55	.48	.44	.42	.46
14	Correlation: Radio vs. Tel.	.41	.41	.38	.45	.41	.41	.51	.31
15	Difference: Screen vs. Radio	.54	.18	.55	.13	1.11	.77	.81	.74
16	Difference: Screen vs. Tel.	.69	.58	.68	.50	1.64	1.33	1.51	1.16
17	Difference: Radio vs. Tel.	.15	.40	.13	.63	.53	.56	.70	.42
18	‡% Diff. Radio Excels Screen, with One Exception	34.0%	9.6%	37.0%	−5.9%	15.7%	10.4%	11.5%	9.7%
19	% Diff. Tel. Excels Screen	43.0%	31.0%	46.0%	23.0%	23.2%	18.0%	21.4%	15.2%
20	% Diff. Tel. Excels Radio	7.0%	19.5%	6.4%	30.0%	6.5%	6.9%	8.9%	5.0%
21	Sigma Diff.: Screen vs. Radio	.15	.15	.20	.21	.24	.23	.30	.34
22	Sigma Diff.: Screen vs. Tel.	.14	.14	.17	.21	.22	.205	.31	.28
23	Sigma Diff.: Radio vs. Tel.	.17	.15	.23	.20	.22	.20	.29	.27
24	Reliability of Diff.: Screen vs. Radio	3.60	1.20	2.70	.59	4.60	3.35	2.70	2.18
25	Reliability of Diff.: Screen vs. Tel.	4.90	4.10	4.00	2.34	7.50	6.50	4.90	4.10
26	Reliability of Diff.: Radio vs. Tel.	.88	2.70	.57	3.10	2.41	2.80	2.40	1.60
27	Advantage: Screen vs. Radio	Radio	Radio	Radio	Screen	Radio	Radio	Radio	Radio
	Chances in 100 of Real Diff.	100.00	88.00	99.70	73.00	100.00	100.00	99.70	98.60
28	Advantage: Screen vs. Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.
	Chances in 100 of Real Diff.	100.00	100.00	100.00	99.00	100.00	100.00	100.00	100.00
29	Advantage: Radio vs. Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.
	Chances in 100 of Real Diff.	81.00	99.70	72.00	100.00	99.00	99.70	99.20	94.00

* The Experimental Groupings were as follows:
No. 1—All of Group X and Sections 1 and 3 of Group Y
No. 2—All of Group X and Group Y
No. 3—Group X only (Non-College Group)
No. 4—Group Y only (College Group)

† Crude recognition frequency as shown abo
The possible score here is 12. No account is t
that the crude score here is lower than the correct

TABLE 2

nted by Screen, Radio and Television—Comparison of Modes

	Col. 3				Col. 4				Col. 5			
NCY	RECOGNITION CORRECTED FOR GUESSING				RAW COMPOSITE OF CORRECTED RECOGNITION AND RECALL				COMPOSITE OF CORRECTED RECOGNITION AND RECALL—WEIGHTED FOR VARIABILITY			
4	1	2	3	4	1	2	3	4	1	2	3	4
75	119	141	66	75	122	143	67	76	120	141	67	74
7.65	9.77	10.71	8.89	12.31	10.78	11.95	10.01	13.66	14.60	15.55	13.78	18.28
8.39	11.71	11.70	10.82	12.47	13.46	13.42	12.37	14.34	19.20	19.00	17.52	21.32
8.81	13.37	13.52	12.03	14.83	15.20	15.48	13.66	17.08	19.30	19.89	18.20	25.90
2.49	6.16	6.19	6.37	5.56	7.75	7.98	7.56	7.96	10.67	12.81	11.57	10.21
1.95	5.67	5.74	5.71	5.66	6.62	6.68	6.82	6.43	10.42	13.77	10.65	7.57
2.07	5.62	5.40	5.48	4.98	6.93	6.60	6.63	6.14	9.62	13.30	9.99	10.42
.288	.565	.521	.784	.642	.701	.667	.923	.913	.974	1.079	1.412	1.187
.225	.520	.483	.703	.654	.599	.559	.833	.737	.952	1.160	1.300	.880
.239	.515	.455	.675	.575	.627	.552	.810	.704	.879	1.120	1.220	1.212
.13	.47	.41	.48	.31	.68	.54	.60	.47	.51	.72	.68	.39
.46	.60	.53	.55	.49	.74	.73	.69	.74	.76	.77	.65	.64
.31	.45	.45	.47	.39	.58	.33	.60	.50	.60	.74	.70	.40
.74	1.94	.99	1.93	.16	2.68	1.47	2.36	.68	4.60	3.45	3.74	3.04
1.16	3.60	2.81	3.14	2.52	4.42	3.43	3.65	3.42	4.70	4.34	4.42	7.62
.42	1.66	1.82	1.21	2.36	1.74	2.06	1.29	2.74	.10	.89	.68	4.58
9.7%	19.9%	9.2%	21.7%	1.3%	24.9%	12.3%	23.6%	5.0%	31.5%	22.2%	27.1%	16.6%
15.2%	36.8%	26.2%	26.1%	20.5%	41.0%	25.6%	36.5%	25.0%	32.2%	27.9%	32.1%	41.7%
5.0%	14.2%	15.6%	11.2%	18.9%	12.9%	13.3%	10.4%	16.0%	.5%	4.7%	3.9%	21.5%
.34	.56	.55	.76	.76	.531	.594	.793	.863	.957	.841	1.093	1.170
.28	.49	.48	.70	.62	.484	.459	.691	.612	.653	.750	1.118	1.198
.27	.54	.50	.71	.69	.562	.642	.731	.721	.818	.820	1.031	1.180
2.18	3.46	1.81	2.54	.21	5.05	2.47	2.98	.79	4.80	4.10	3.43	2.60
4.10	7.40	5.90	4.50	4.10	9.13	7.69	5.28	5.59	7.20	5.79	3.95	6.38
1.60	3.05	3.90	1.70	3.40	3.10	3.21	1.76	3.80	.12	1.09	.66	3.88
Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio	Radio
98.60	100.00	96.00	99.40	58.00	100.00	99.40	99.90	79.00	100.00	100.00	100.00	99.50
Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.	Tel.
94.00	100.00	100.00	96.00	100.00	100.00	100.00	96.00	100.00	54.00	86.00	74.00	100.00

y as shown above covers only the total real items recognized. No account is taken of the 12 fictitious items, with the result than the corrected score.

‡ This is interpreted to mean that where a certain average number of items are remembered by screen mode, 34% more are remembered by radio mode in Situation 1; 9.6% more by radio mode in Situation 2; and so on.

Section Two, Group Y, to move the apparatus into a classroom in the middle of a class period. The result was a noticeable disturbance of the subjects which was reflected in the only case of reversal of advantage in the visual vs. auditory comparison. Under the circumstances, it seemed advisable to compute the scores inclusive of Section Two (No. 2) and exclusive of Section Two (No. 1). Table 2 shows the results.

MODAL COMPARISONS

Television mode always surpasses visual mode by advantages ranging from 15.2 to 46 per cent above the average for the screen mode, with completely reliable differences in 19 out of the 20 experimental groupings of data shown in Table 2.

Television mode always surpasses radio mode but by much smaller margins (five-tenths of one per cent up to 30 per cent), and only eight of the 20 experimental groupings show completely reliable differences.

Radio mode is superior to screen mode by per cents ranging from 1.3 to 37 in 19 out of the 20 experimental groupings, and the difference is reliable in 14 of these 19 situations. The one case of reversal (and that only in the case of recall and not for recognition) is for the section in which there were disturbed experimental conditions. It happened that the auditory mode came first in the rotation schedule for this section and it is believed that the excessive disturbance of the group at the outset of the experiment was accountable for this reversal. The visual advantage was small and the difference low in reliability.

In analyzing the data of Table 2, some note should be taken of the fact that recognition scores are much higher than aided recall scores. These results agree generally with the findings of Myers[4] and Achilles[5] showing that recognition scores tend to run from two to four times as high as recall scores.

[4] Myers, G. C. A Comparative Study of Recognition and Recall. *Psych. Rev.*, 1914, 21, 442–456.

[5] Achilles, E. M. Experimental Studies of Recall and Recognition. *Archiv. Psychol.*, 1920, No. 44.

Recognition scores are shown both for crude and corrected calculations. Crude scores merely take account of the total number of real items recognized among the real items presented; whereas, the corrected[6] recognition scores make allowance for recognition of both the twelve real and the twelve fictitious items, maximum score 24.

Due to the difficulties of incidental memory,[7] there was a tendency toward zero scores in aided recall; on the other hand, a subject making a low recall score might do fairly well in recognition. In view of this discrepancy, the author takes the position that a combination of recall and recognition scores in what he calls COMPOSITE MEMORY is a fairer measure of memory than is either recall or recognition alone. Further, it is a great convenience to have a single measure of memory where many comparisons are being made. Both raw composite scores and composites weighted for variability[8] are shown in Table 2.

A study of the frequency distribution of scores indicates that the weighted composite scores are distributed in a fairly normal manner. There is some positive skewness, probably due to the numerous low scores resulting from the difficulties of incidental memory. Graph 1, showing this distribution, indicates that the reliability[9] formulas used in the present study may be looked upon as fairly adequate for the interpretation of data.

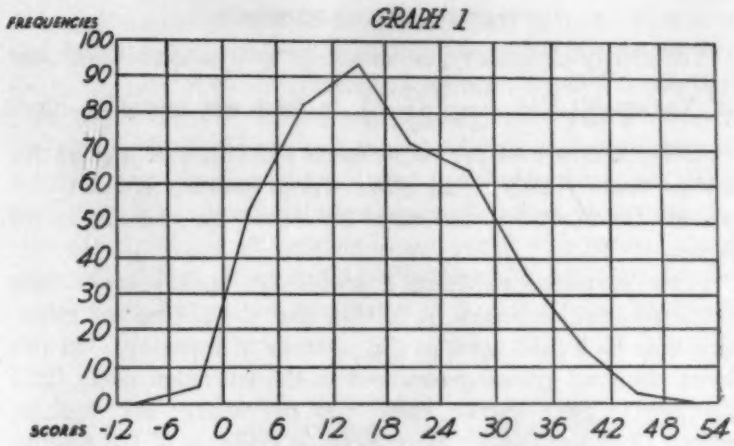
Table 3 shows that breaking up the advertisements into serial sections for visual mode facilitated memory. Breaking up the copy meant that the trade name was presented *alone* at

[6] Corrected recognition scores were computed by the Achilles formula: Corrected Score equals Total Number of Real and Fiecititious Items—(Number Doubtful + Two times the Number Wrong).

[7] Low scores for incidental recall are in accord with the findings of Müller, G. E., and Pilzecker, A., Experimentelle Beiträge zur Lehre vom Gedächtnis, *Zsch. für Psychol.*, Ergänzungsband I, 1900, 174–198; and Skaggs, E. B. Further Studies in Retroactive Inhibition, *Psychol. Mon.*, 1925, 34, 8.

[8] Garrett, H. E. Statistics in Psychology and Education. New York: Longmans, Green and Company, 1926.

[9] *Ibid.*



GRAPH 1

Frequency Distribution; All Scores, All Modes. Both Groups, N = 141; Composite of Aided Recall and Corrected Recognition, with Weighting for Variability.

the beginning and again almost alone at the end. This provided repetition which permitted distributed learning; indeed, this may be interpreted to mean that one reason trade names were remembered better by radio than by screen was that radio offered a better opportunity for distributed learning, for repetition without the disturbing and conflicting elements in the body of the advertisement which were present when it was presented in its entirety on the screen.

TABLE 3
Unbroken vs. Broken Visual Presentation

	UNBROKEN		BROKEN
Av. Score	13.10		14.21
SD	7.01		7.10
Sigma Av.	.586		.594
Diff		1.11	
r		.65 ± .033	
Sigma Diff.		.483	
Diff./Sigma Diff.		2.30 (98.9 chances in 100)	

VARIABILITY AND GUESSING

Variability of memory, as measured by Pearson's Coefficient of Variation $\left(V = \frac{100 \text{ Sigma}}{\text{Average}}\right)$, is least for television mode (66.87), next lowest for radio mode (72.47), and highest for screen mode (82.38). In other words, scoring is most consistent for television and more consistent for radio than for screen.

Since corrected recognition scores are always lower than crude recognition scores, it follows that the amount of reduction may be looked upon as the measure of guessing. On this basis, the least guessing occurred in the television mode (22.7 per cent); next lowest, radio (29 per cent); and highest, screen (32.1 per cent). Here again is evidence of the relative efficiency of modes in the order: 1. Television, 2. Radio, 3. Screen.

COMPARISON OF GROUPS

Referring back to Table 2, we find the following Group Comparisons: Group Y (college group) always excels Group X in memory, for all modes and for all combinations of the experimental data. Both groups[10] favor the three modes in the following order: television first, radio second, and screen third.

While both groups generally favor radio over screen, Group X excels in memory for radio over screen by far larger and far more significant differences than does Group Y. Likewise, the superiority of television over screen is more marked and more reliable in Group X than in Group Y. The advantage of television over radio is less marked in Group X than in Group Y.

SEX COMPARISONS

Sex comparisons show that men of both groups excel women[11] in total memory ability. Table 4 indicates that both

[10] One exception should be noted, namely, that of Section 2 of Group Y, which, under faulty experimental conditions, excelled in recall for screen over radio mode.

[11] Memory tests show an advantage for women, according to Woodworth

men and women show a memory advantage for television over either radio or screen but that the differences for women are far larger and more reliable than for men. Table 4 shows that men and women of both groups demonstrate better memory for radio than for screen and that the differences are large and reliable for women and small and unreliable for men. This finding that women remember so much better than men for television or radio advertising as compared with screen advertising should be of interest to advertisers of products for the home, since women are recognized as buyers for the home. It

TABLE 4
Sex Comparisons

GROUP	SEX	MODE FAVORED	DIFF.	% DIFF.	D/SIGMA D	CHANCES IN 100
X	Women	Radio over Screen	4.88	65.5	4.08	100
X	Men	Radio over Screen	.44	3.8	.47	68
Y	Women	Radio over Screen	1.05	8.7	.80	79
Y	Men	Radio over Screen	.53	3.4	.45	67
X and Y	Women	Radio over Screen	2.74	27.2	3.28	100
X and Y	Men	Radio over Screen	.48	3.5	.64	74
X	Women	Tel. over Screen	5.76	77.3	6.62	100
X	Men	Tel. over Screen	2.04	17.0	2.15	98.3
Y	Women	Tel. over Screen	4.78	39.5	6.10	100
Y	Men	Tel. over Screen	2.18	14.1	1.84	96
X and Y	Women	Tel. over Screen	5.64	56.1	8.57	100
X and Y	Men	Tel. over Screen	2.11	15.4	2.88	99.8
X	Women	Tel. over Radio	.88	7.1	.48	68
X	Men	Tel. over Radio	1.60	12.9	1.77	96
Y	Women	Tel. over Radio	3.73	28.3	3.37	100
Y	Men	Tel. over Radio	1.65	10.3	1.66	95
X and Y	Women	Tel. over Radio	2.90	22.7	3.69	100
X and Y	Men	Tel. over Radio	1.63	11.5	2.44	99.3

and others, but Dietze holds there is no justification for a dogmatic stand. He cites evidence in favor of men. See Dietze, Alfred G. Some Sex Difference in Factual Memory. *Am. Jour. Psychol.*, 1932, 44, 319–321.

may be noted in this connection that the author's[12] Indianapolis experiment in the life situation showed similar results.

Women do more guessing by all three modes than men. Correction for guessing shows the women's greatest score reduction for screen mode (37.2 per cent), next largest for radio mode (31 per cent), and least for television (22.8 per cent). This means that there was most guessing for screen mode and least for television mode.

Women are less variable than men for television and radio modes but more variable than men for screen mode. Coefficients of variation are shown below:

	Screen	*Radio*	*Televison*
Women	77.1	46.8	38.5
Men	57.2	50.1	43.4

DESCRIPTIVE VS. NON-DESCRIPTIVE TRADE NAMES

Descriptive trade names were recalled 5.7 times as often as non-descriptive trade names for all modes and for both groups combined. The ratio is highest for radio mode and for Group X, with a maximum ratio of 10.07 to 1. The advantage of descriptive over non-descriptive trade names also prevails for

TABLE 5

Descriptive vs. Non-Descriptive Trade Names

GROUP	SCREEN	RADIO	TELEVISION	ALL MODES
Ratio of Recall Frequency; Descriptive to Non-Descriptive Trade Names				
X	6.01 to 1	10.07 to 1	5.28 to 1	
Y	4.30 to 1	7.15 to 1	4.59 to 1	
X & Y	4.88 to 1	8.12 to 1	4.84 to 1	5.70 to 1
Ratio of Recognition Frequency; Desc. to Non-Desc. Trade Names				
X	1.27 to 1	1.18 to 1	1.26 to 1	
Y	1.42 to 1	1.22 to 1	1.26 to 1	
X & Y	1.32 to 1	1.20 to 1	1.26 to 1	1.26 to 1

[12] Elliott, Frank R. Memory Effects from Poster, Radio and Poster-Radio Advertising of an Exhibit—Part I. *Jour. App. Psych.*, 1937, 21, 504–512.

recognition, though the differences here are small (1.26 to 1), as might be expected where the problem is the easier one of identification rather than the more difficult one of association. Table 5 shows these ratios.

The method of correlation ratios indicates that the names most often classified as descriptive were also the names most often recalled, and that the relationship between descriptiveness and ability to recall names was greatest for the radio mode. Correlation ratios:

Screen:	Recall vs. Descriptiveness	$r = +.573 \pm .07$
Radio:	Recall vs. Descriptiveness	$r = +.645 \pm .07$
Television:	Recall vs. Descriptiveness	$r = +.430 \pm .09$

AGE AND INTELLIGENCE VS. MEMORY

Table 6 shows a negative correlation between age and memory, which means that the older the subject is, the poorer is his memory. The table shows a positive but not high correlation between intelligence and memory; which gives some indication, though not conclusive evidence, that the more intelligent the subject is, the better is his memory. Further, the net correlation ratios show that the more intelligent person tends to respond best to screen presentation, since the ratio is highest for screen mode (+.46 as compared with +.39 for television and +.29 for radio).

TABLE 6

Age and Intelligence vs. Memory

(Weighted Composite Scores for 60 Members of Group X)

COMPARISON	RAW CORRELATION	NET CORRELATION (AGE PARTIALLED OUT)
Age vs. Screen Memory	$-.36 \pm .08$	
Age vs. Radio Memory	$-.49 \pm .065$	
Age vs. Television Memory	$-.49 \pm .065$	
Intell. vs. Screen Memory	$+.48 \pm .065$	+.46
Intell. vs. Radio Memory	$+.34 \pm .08$	+.29
Intell. vs. Television Memory	$+.42 \pm .07$	+.39

SUMMARY AND CONCLUSIONS

In the main, the present study offers a laboratory verification of the author's field investigations showing that the effectiveness on memory of three modes of advertising is as follows: most effective, television; second, radio; third, screen. Differences are completely reliable in 19 of the 20 comparisons between television and screen modes, in 14 of the 20 comparisons between radio and screen modes, and in about half of the 20 comparisons between television and radio modes. Variability and guessing are least with television mode, next lowest with radio, and largest with screen.

Superiority of radio over screen mode is more marked in Group X (non-college) than in Group Y (college); differences are reliable in each of the five comparisons in the non-college group but reliable in only one comparison out of five in the college group. Superiority of television over screen mode is very marked and reliable in both groups.

Group comparisons show that the college group remembers more than the non-college group. While both groups remember more by radio than by screen mode, the radio advantage is greater in the non-college than in the college group.

Sex comparisons show that women give a much greater advantage to radio over screen mode than men. Women likewise give greater advantage to visual-auditory over screen and radio mode than men.

Comparisons of materials show that descriptive trade names are recalled 5.7 times as often as non-descriptive trade names. The non-college group shows the greatest memory advantage for descriptive over non-descriptive material, 10.07 to 1, and that advantage is by radio mode. Radio mode lends itself better to easy, descriptive trade names than to the more difficult, non-descriptive trade names.

The uniform superiority of visual-auditory mode may be accounted for on the basis of improved clarity and certainty of reception, of summation effects, of facilitation, of intersensory heightening effects.

Superiority of radio over screen mode may be due in part to

the physiological advantage of sound being non-directional and, therefore, not requiring the direct fixation of the stimulus-object which vision requires. Another advantage is the social significance of sound. Still another possibility is that people may be changing from visual to auditory habits due to the enormous increase of sound stimulation, through the radio, the public address system, and the sound movie.

The author advances the hypothesis of *Visual-Auditory Shift* to explain the apparent general contradiction which exists between the early and the more recent results of most visual vs. auditory experiments. Prior to about 1930 the finding was generally in favor of memory advantage for visual mode; since then it has been generally in favor of auditory mode. Why this reversal?

Ample evidence[13] exists to show that children shift from auditory to visual dominance at the age when they learn to read. The question is: Are they now, as adults, shifting back to auditory dominance? Two findings of the present studies point to the affirmative answer. One is that women show greater auditory advantage than men, which is what might be expected in view of surveys[14] indicating that women listen far more to radio than men listen to radio. Another finding is that the less educated and less intelligent remember better by radio than the more educated and the more intelligent do by radio. This is what would be expected in view of surveys showing that the less schooled and the less intelligent sections of the population listen far more to radio than the better educated and the more intelligent listen. In other words, those who listen most are the best listeners and, therefore, remember better that which they hear than that which they see. The author has an experiment under way at this writing to attempt to determine the rôle of habituation in the building up of visual or auditory dominance.

[13] Löwenfeld, Hetzer, Kirkpatrick and others have demonstrated the auditory-visual shift in children at the age of learning to read.

[14] See Cantril, Hadley, and Allport, Gordon W. The Psychology of Radio. New York: Harper. 1935.

A TEST OF EYE–HAND COORDINATION

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THE test of eye-hand coordination reported here was an attempt to develop a reliable measuring instrument which could be applied to children as well as to adults. Every attempt was made to include methods of motivation which would prove effective for both young and old subjects.

The test is relatively simple. It is composed of a rectangular box in the top of which are bored thirty-two round holes in rows of eight. In a slot at the end of each row of holes are placed eight marbles. The subject after going through the first row for practice, is timed in placing the marbles in the holes one at a time consecutively. Each group of eight marbles is of a different color. The test-score is the total time in seconds it takes the subject to complete the test in three trials.

Since holes in the top of the test do not have bevelled edges the subject must place the marbles squarely in them. The subject is seated while taking the test. The marbles are placed at the subject's left so that the right hand can be used. The height of the test from the floor has been held constant by placing it on a standard typing table twenty-six inches tall. This height was held constant for all subjects except those in the first grade. In the first grade the height was regulated so a child would be able to reach the marbles without being forced to hold his elbows up and out from his side.

The following diagram of the test makes certain points clear.

The practice trial on the first row of marbles enables the tester to correct any errors the subject might make and at the same time assists the subject in getting over the initial excitement which usually precedes a test. After the practice trial on the first eight marbles the tester replaces the eight marbles

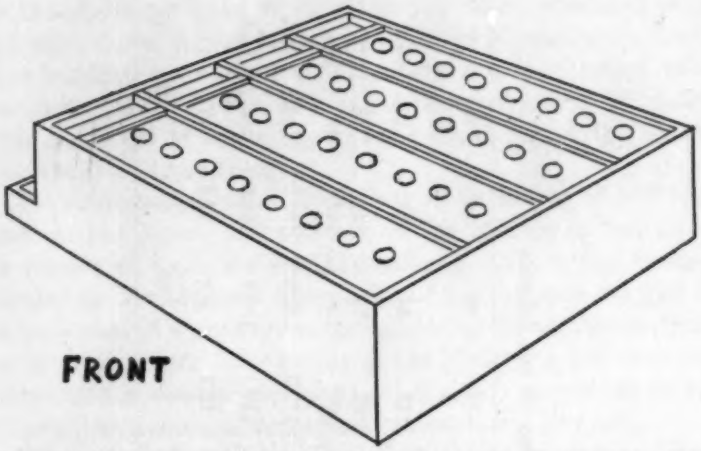

DIAGRAM 1. Overall dimensions of the apparatus are 4″ x 16″ x 19¼″. Two and one-quarter inches are allowed for the tray in which the marbles are returned after one part of the experiment has been completed. The corner of this projects at the lower left front of the diagram. The starting tray (extending across the left hand end of the apparatus) is 1¼″ wide and ¼″ deeper than the surface of the board which contains the holes. The holes, ¾″ in diameter and ½″ deep, are spaced 2″ from center to center.

in the slot and gives the following directions to the subject: "This time you are to put all the marbles in the holes (pointing). Do this row, this row, et cetera, as fast as you can. Get your fingers on a marble now and at the signal 'Go' put the marbles in as fast as you can. Ready? Go!"

The reliability of the Moore eye-hand coordination test was determined on a group of 187 elementary, high-school and college subjects. The elementary and high school subjects were selected by grade classification, whereas the college students were juniors and seniors taking educational psychology. The test retest method, after an interval of one week was used as the method of determining reliability. The coefficient was $.95 \pm .006$.* The step interval used in determining this correlation was four seconds.

Validity: To get a measure of validity the scores of a subject

* Pearson Product Moment.

TABLE I

The Effect of Age on Eye-Hand Coordination Time for 602 Subjects

Ages	6	7	8	9	10	11	12	13	14	15	16
Number of Subjects	33	58	66	42	18	38	45	43	28	24	207
Range	121 200	110 195	105 175	93 160	101 142	100 135	81 150	84 130	83 141	82 133	75 125
Median	166.3	145.0	133.0	130.0	120.0	116.5	115.9	110.8	107.3	103.8	95.4
Mean	162.6	144.5	135.0	132.9	123.3	118.1	116.1	109.7	108.9	104.5	93.3
S. D.	19.7	15.5	15.2	14.9	12.1	7.7	12.1	9.2	12.9	11.7	11.0
σ(av.)	3.42	2.02	1.87	2.30	2.86	1.25	1.80	1.40	2.44	2.39	.77

on the Moore eye-hand coordination test were correlated with the score made on the Minnesota Rate of Manipulation Test. One hundred seventy-three elementary and high school subjects were tested. The Coefficient of Correlation was .71 ± .03. This coefficient is not so high as the reliability of the Moore test would lead one to expect.

The subjects obtained a Coefficient of Variation[1] of 10.7 seconds on the Moore test whereas on the Minnesota test their Coefficient of Variation was 13.0 seconds. When the relative variability is translated into per cent[2] the subjects are found to have been 82.4 per cent more variable on the Minnesota than on the Moore test. The author of the Minnesota test does not state any quantitative coefficient of reliability or validity hence a direct comparison of numerical values cannot be made.

Measure of Maturation: The effect of age on speed of eye-hand coordination is presented in Table I.

In the foregoing table it can be seen that speed increases with age, although overlapping occurred at each age level. The Coefficient of Correlation between speed and age was $-.82 \pm .009$.

Differences Due to Sex and Race: Table II presents a comparison of the speed of both white and negro boys and girls.

TABLE II

The Reliability of the Difference Between the Median Time for Boys and Girls

GROUP	N	SEX	MDN.	P.E. MDN.	DIFF. / P.E.$_{diff.}$	CRITICAL RATIO
White Primary	56	Boys	146.0	1.96	7.55	
Pupils	79	Girls	138.45	1.23	2.31	3.28
Negro Primary	49	Boys	132.3	1.93	9.80	
Pupils	38	Girls	122.5	2.78	3.38	2.89
College Juniors	55	Boys	96.9	1.29	5.35	
and Seniors (W)	68	Girls	91.55	.554	1.40	3.81

[1] $V = \frac{100 \times \sigma}{\text{Mean}}$.

[2] Garrett, Henry E. *Statistics in Psychology and Education.* New York: Longmans, Green and Co., 1933, p. 40–42.

Girls are consistently faster than boys, from the above table, although the differences are not statistically reliable. However, the difference can be expected to be greater than zero in favor of the girls ninety-seven times out of a hundred. A comparison of the median time of white and negro boys, and white and negro girls in Table II shows no significant difference.

CONCLUSIONS

1. The Moore Eye-Hand Coordination test and the Minnesota Rate of Manipulation test seem to be measuring a common factor judging from a coefficient of correlation of $.71 \pm .026$ based on a study of 173 subjects.

2. The reliability coefficient based on a retest of 187 subjects after an interval of one week, was $.95 \pm .006$.

3. The scores on the Moore test are less variable than the scores on the Minnesota Rate of Manipulation test.

4. Speed increases with age although overlapping occurred at all ages. The correlation between age and speed was $-.82 \pm .009$.

5. Girls were consistently faster than boys, but the difference was not statistically reliable.

6. No race difference was apparent.

AN EVALUATION OF THE FERGUSON FORM BOARDS AND THE DERIVATION OF NEW AGE AND GRADE NORMS

PART II.—PRESENTATION OF NORMS AND DISCUSSION

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TABULATION OF DATA

IN THE following tables and figures are presented the classificatory data with reference to the experimental group of 582 subjects and the results obtained from testing them. Table 2 presents the age and grade distribution of both the total number of subjects and of the group divided according to sex. In Tables 3 and 4, norms are presented for both time and score for chronological age and school grade. Figures 4 to 7, inclusive, are graphs representing the results included in Tables 3 and 4. Tables 5 to 7, inclusive, present the distribution of results on the Kuhlmann-Anderson test and the Ferguson Form Boards, the results for the Ferguson Form Boards being presented in terms of both scoring methods finally adopted, *i.e.*, total time and score.

DISCUSSION OF RESULTS

The relatively small number of subjects tested in this experiment does not justify presentation of norms in percentiles other than the twenty-fifth, fiftieth, and seventy-fifth percentiles. These percentile measurements, derived from the results of the Ferguson Form Boards, have been presented in the preceding section. Norms for both age and grade are given to facilitate the use of this test by clinical workers.

[1] The introductory section of this study appeared in this Journal, Vol. XXI, No. 5, pp. 556–571.

TABLE 2

The Age, Grade and Sex Distribution of the Subjects

SUBJECTS		B	G	T		B	G	T		B	G	T		B	G	T		B	G	T		B	G	T		B	G	T
Ages	5	0	1	1	6	11	10	21	7	36	29	65	8	30	29	59	9	40	32	72	10	37	40	77	11	47	36	83
Grades	2	50	31	81	3	41	39	80	4	43	38	81	5	41	39	80	6	41	39	80	7	53	38	91	8	52	37	89

TABLE 2.—*Continued*

SUBJECTS		B	G	T		B	G	T		B	G	T		B	G	T		B	G	T		B	G	T
Ages	12	41	30	71	13	41	37	78	14	25	12	37	15	11	2	13	16	1	2	3	17	1	1	2
Grades				0				0				0				0				0				0

No. of B(oys)—321. No. of G(irls)—261. T(otals)—582.

TABLE 3

The Medians Together with the 25th and 75th Percentiles for Scores and Time, in Seconds, on the Ferguson Form Boards for the Subjects Grouped According to Chronological Age and Sex (N = 582)

		AGE	6	7	8	9	10	11	12	13	14	15
25th Percentile	Score	Boys	106	170	155	190	338	298	391	391	419	459
		Girls	97	120	130	230	242	242	288	341	350	
		B & G	101	147	138	209	266	269	348	359	409	453
	Time	Boys	1363	1100	975	875	713	611	659	621	521	569
		Girls	1369	1138	1113	900	933	700	637	693	650	
		B & G	1366	1123	998	880	802	626	654	660	556	581
Median	Score	Boys	133	215	240	288	411	466	475	464	492	494
		Girls	113	168	185	300	288	338	400	393	500	
		B & G	120	196	213	295	355	423	453	436	494	494
	Time	Boys	1475	1240	1150	1100	829	744	732	754	731	638
		Girls	1475	1288	1313	1050	1088	950	863	854	725	
		B & G	1475	1254	1242	1050	946	791	754	778	729	642
75th Percentile	Score	Boys	163	270	326	386	481	589	539	579	713	631
		Girls	156	259	268	383	369	475	558	488	550	
		B & G	160	266	311	385	432	570	542	525	638	619
	Time	Boys	1588	1360	1413	1280	988	1021	847	859	813	738
		Girls	1581	1446	1438	1250	1213	1183	1075	947	900	
		B & G	1584	1390	1421	1275	1131	1113	963	905	834	746

TABLE 4

The Medians Together with the 25th and 75th Percentiles for Scores and Time, in Seconds, on the Ferguson Form Boards for the Subjects Grouped According to School Grade and Sex (N = 582)

		GRADE	2	3	4	5	6	7	8
25th Percentile	Score	Boys	144	172	223	333	402	411	400
		Girls	98	146	215	263	219	358	343
		B & G	123	161	219	290	247	378	376
	Time	Boys	1125	953	794	703	595	603	563
		Girls	1322	1047	919	905	794	692	638
		B & G	1188	1000	843	750	633	640	595
Median	Score	Boys	197	256	325	421	475	481	500
		Girls	133	198	275	328	279	417	456
		B & G	168	221	290	368	410	461	484
	Time	Boys	1300	1138	975	813	738	716	708
		Girls	1438	1258	1122	1006	1058	800	742
		B & G	1361	1221	1105	919	837	744	719
75th Percentile	Score	Boys	248	356	423	492	609	579	633
		Girls	180	289	344	389	416	508	548
		B & G	232	319	394	456	558	547	598
	Time	Boys	1442	1319	1253	979	888	818	850
		Girls	1578	1388	1238	1141	1253	925	1008
		B & G	1492	1360	1247	1083	1175	883	879

Furthermore, as time and scores both seem to be effective methods of measuring performance, norms for both these variables are presented.

While the medians of the grades show considerable regularity, there are deviations from the expected progression in the quartiles for the grades and in the medians and quartiles for the age groups. While most of these are minor in character the deviation of the median at age 13 is of more consequence. This deviation is in the direction of a performance inferior to the expected performance at this age. The progression of the quartiles representing inferior behavior at this point is fairly constant, while the deviation of the quartile representing superior performance is larger than that of the median but in the same direction.

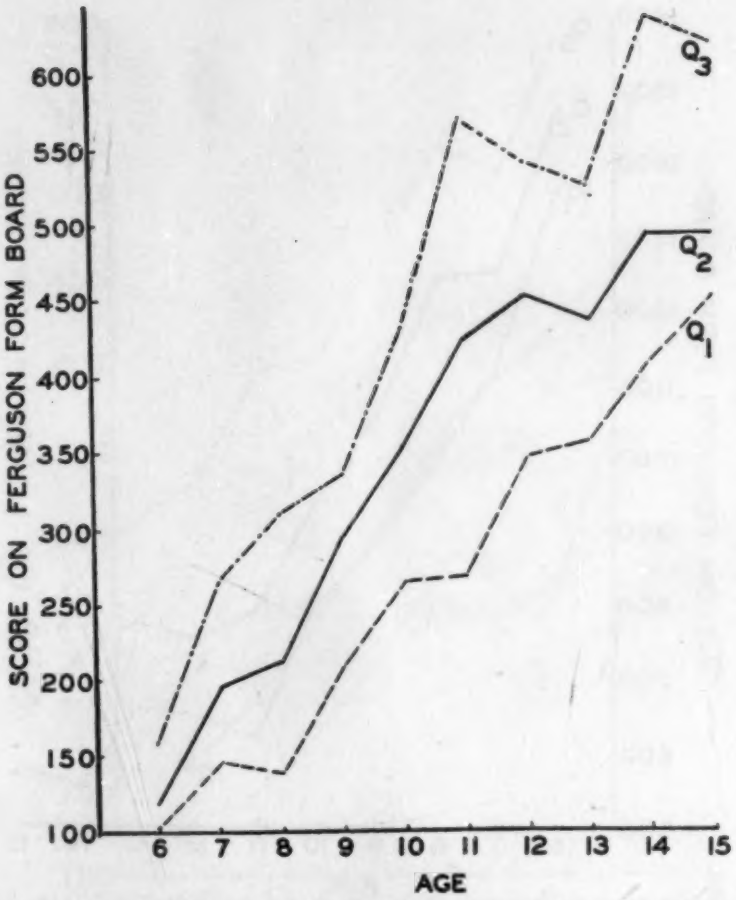

FIGURE 4. A Graph of the Medians, 25th and 75th Percentiles of Scores Derived from Table 3.

When only 58 cases were tested at age 13, the median score was 415. The median was raised 21 points, *i.e.*, to 436, by the addition of 20 cases. While this might suggest that the uneven progression of the medians at this level is caused by the small number of subjects, two considerations tend to contradict such an assumption. The first is the relatively large number of

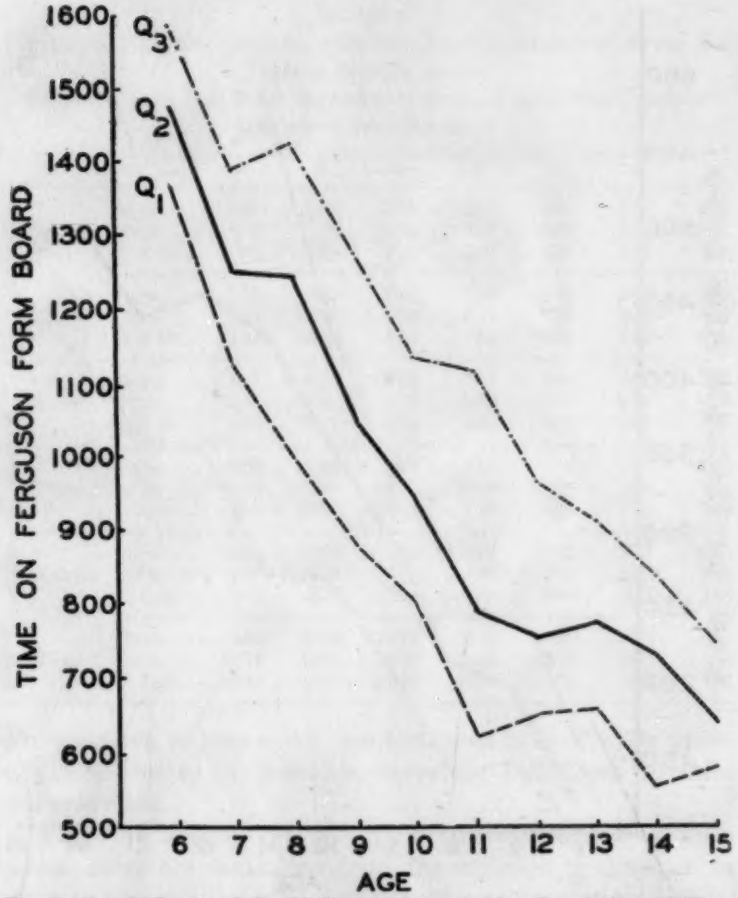

FIGURE 5. A Graph of the Medians, 25th and 75th Percentiles of Time Derived from Table 3.

subjects at this age, and the second is the occurrence of the deviation only in the quartiles representing superior performance which suggests that it is caused by the selection occurring at the higher ages in the elementary school.

It is also possible that the test does not discriminate above these age and grade levels. This seems improbable as previous

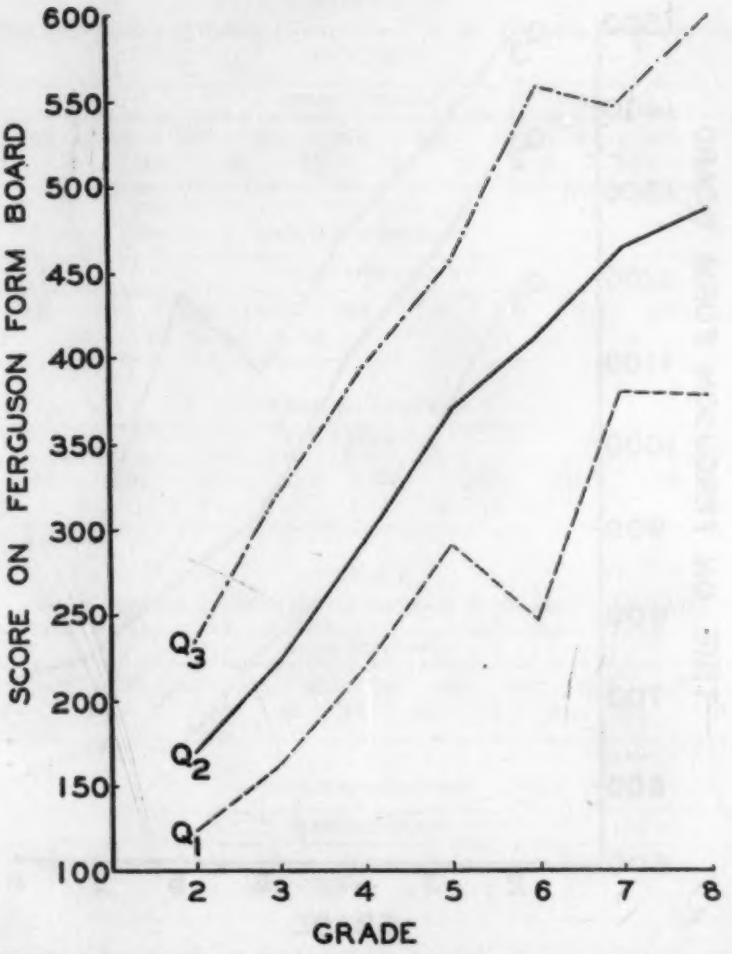

FIGURE 6. A Graph of the Medians, 25th and 75th Percentiles of Scores Derived from Table 4.

experimenters give norms for sixteen-year-old subjects (2: p. 127) and seniors in college (3: pp. 53–57). Furthermore, if the discriminative capacity of the test were exhausted at this level, there would be no appreciable increase in the medians

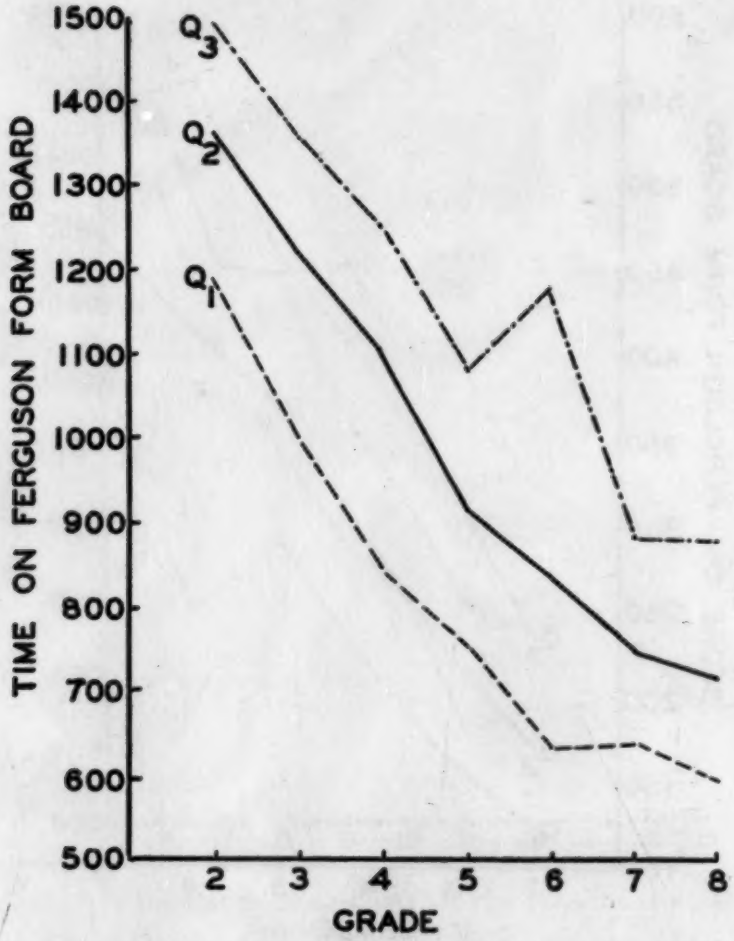

FIGURE 7. A Graph of the Medians, 25th and 75th Percentiles of Time Derived from Table 4.

beyond age 12. This is not true, since the median at both 14 and 15 years is higher than that at age 12.

The increase in the medians which occurs at successive ages and grades suggests that these norms are not entirely arbitrary

TABLE 5

The Distribution of Scores (Units/Time) on the Ferguson Form Boards (N = 582)

	CLASS INTERVALS								
	50	100	150	200	250	300	350	400	450
f	2	16	49	50	62	58	56	65	55

TABLE 5.—*Continued*

	CLASS INTERVALS								
	500	550	600	650	700	750	800	850	900
f	56	29	24	16	11	10	12	4	1

TABLE 5.—*Continued*

	CLASS INTERVALS							
	950	1000	1050	1100	1150	1200	1250	1300
f	0	1	1	1	2	0	1	

TABLE 6

The Distribution of Time on the Ferguson Form Boards (N = 582)

	CLASS INTERVALS									
	250	350	450	550	650	750	850	950	1050	1150
f	3	7	31	49	71	69	65	52	54	46

TABLE 6.—*Continued*

	CLASS INTERVALS						
	1250	1350	1450	1550	1650	1750	1850
f	52	35	21	19	3	5	

TABLE 7

The Distribution of Growth Units on the Kuhlmann-Anderson Test (N = 350)

	CLASS INTERVALS								
	260	270	280	290	300	310	320	330	340
f	7	7	21	25	21	23	33	32	29

TABLE 7.—*Continued*

	CLASS INTERVALS					
	350	360	370	380	390	400
f	59	45	32	15	1	

and tentative and that they may be used by clinical workers and others in conjunction with the revised instructions for administering the test. The small number of subjects represented at the extremes of the chronological age range, however, does not justify the use of the age norms at these extremes. This limitation also applies to the norms for the separate sexes, which may be used only tentatively.

The validity of norms such as these depends to some extent on the degree to which the data approximate a normal distribution. The distributions of the data for both time and scores (Tables 5 and 6) appear to be satisfactory in this respect. The indices of skewness, .36 and .28, respectively, do not seem to be significant. In the distribution for scores, disregarding 7 cases (out of 582) occurring in the intervals from 850 to 1250 makes the remaining data approximate a normal distribution.

The distribution of Growth Units shows a slight negative skew (index of skewness $-.54$), *i.e.*, in the direction of poor performance on the Kuhlmann-Anderson test (Table 7), but in this case the table is based on only 350 cases whereas Tables 5 and 6 are based on 582 cases.

These distributions seem to justify the assumption that the group is relatively free from selective influences and, consequently, may represent a group of average, urban, school children.

The results show that the boys are consistently superior to the girls in their performance as judged both by time and score. No exceptions occur in the age norms. This confirms Bronner's statement (2: p. 127) that boys excel girls in their performance on this test, and qualifies Ferguson's statement (3: p. 58) that 48 per cent of the girls equal or excel the median of the boys.

In order to determine the validity of the Ferguson Form Boards as measures of intelligence, coefficients of correlation were calculated for Kuhlmann-Anderson Growth Units and the two indices of Ferguson Form Board performance, *i.e.*, time and score. Since all of these relationships appeared to be curvilinear, it became necessary to compute a ratio of correlation (η) for these pairs of variables (Tables 1 and 8). The ratio of correlation between Growth Units and Ferguson Form Board scores is $+.733 \pm .01$ and that of Growth Units with Ferguson Form Board time is $-.735 \pm .01$. These ratios are not corrected for chronological age since no formula seems to be available for holding one of three variables constant in an *eta* correlation. When the coefficients are substituted for the ratios of correlation, *i.e.*, $+.662 \pm .02$ and $-.688 \pm .02$, respectively, and chronological age is held constant, the partial correlation for Growth Units and score is $+.403 \pm .03$ and for Growth Units and time is $-.463 \pm .03$. These partial correlations correspond very closely to the coefficients of correlation obtained between Ferguson Form Board scores and Growth Units when chronological age has but a negligible influence on either, *i.e.*, the correlations of Growth Units and scores of grades 2 and 3, 4 and 5, and 6 and 7, *viz.*, $+.426 \pm .06$, $+.456 \pm .05$, and $+.427 \pm 06$, respectively.

The ratios of correlation between performance on the Ferguson Form Boards and Growth Units (Table 1) are higher than the coefficients of correlation obtained in most similar studies of the relation between verbal and performance tests of intelligence (8: pp. 58–60). Since in many of these studies chronological age has not been held constant, the coefficients of correlation cannot be directly compared with the *partial* correlations (Table 8) obtained in this study. Even so, these partial correlations are as large as or larger than the majority of *uncorrected* coefficients reported in these studies. The inference seems to be justified that the Ferguson Form Boards measure the same type of behavior as verbal tests of intelligence to a greater extent than many other performance tests. The coefficients of

correlation of scores and Growth Units at the various grade levels (Table 8) show, furthermore, that the relation between these tests remains constant throughout the range of ages represented in grades 2 to 7, inclusive. It is apparent, however, that one type of test cannot be satisfactorily substituted for the other as a measure of intelligence.

The nature of the capacity measured by the Form Boards cannot be determined from the results of this investigation. The steady increase in the norms together with the ratio of correlation between performance on the test and chronological age indicates, however, that the test measures some component of development or growth.

It is, furthermore, necessary to consider the relation of speed to performance in this type of behavior. The correlation of units and time is $-.901 \pm .01$ (Table 1), but with age held constant, the correlation is $-.777 \pm .01$. This latter correlation is higher than those obtained on verbal tests in correlating rate and level of performance when chronological age is held constant (coefficients of correlation corrected for attenuation range from $+.39$ to $+.61$. 4: p. 32). The obvious inference is that rate and level of performance are as closely related in a performance test of this type as they are on a verbal test.

The reliability of the test has been measured by the regularity of the progression of scores made on the test according to both a grade and an age scale, a procedure which has been used and justified by Kuhlmann in developing the Kuhlmann-Anderson tests (6: pp. 10–11 and 5: pp. 188–201). The reliability of this test is, therefore, indicated by the constancy of the increase in the medians of the scores at each step interval. In the grade norms the progression of the medians at each level is regular. This regularity is also apparent in the age norms, though to a slightly lesser degree. The slight irregularities that are present are probably a result of the small number of cases, except that at age 13, which has already been discussed.

The manner in which the results are obtained is not the only consideration bearing on the reliability of test results. Unre-

TABLE 8

The Correlations Obtained to Determine the Relationship of the Ferguson Form Boards to the Kuhlmann-Anderson Test

DATA CORRELATED	N	r	η_{xy}	INDEX OF CURVILINEARITY	η_{yx}	INDEX OF CURVILINEARITY
Score on F.F.B. and growth units with C.A. held constant	350	$+.403 \pm .03$				
Time on F.F.B and growth units with C.A. held constant	350	$-.463 \pm .03$				
Growth units and C.A.: x–G.U.; y–C.A.	350	$+.783 \pm .01$	$+.832 \pm .01$	5.26	$+.796 \pm .01$	2.71
Score on F.F.B. and growth units Grades 2 & 3	100	$+.426 \pm .06$				
Score on F.F.B. and growth units Grades 4 & 5	100	$+.456 \pm .05$				
Score on F.F.B. and growth units Grades 6 & 7	100	$+.427 \pm .06$				
Units and time on the F.F.B. with C.A. held constant	582	$-.777 \pm .01$				

liability may also occur as a consequence of the inadequate standardization of the instructions previous to the experimental period, inadequate preparation of the examiner, and statistical inaccuracies. To avoid inaccuracies resulting from these sources of error, the experimental work was not begun until the examiner had given more than 150 tests; no child in the experimental group was tested until the instructions had been used in 50 trial cases without revealing any inadequacy; the tests were given under uniform conditions; and all scoring and statistical computation were done twice.

SUMMARY

The following generalizations seem to be warranted by the results of the present study:

1. The experimental group used in the present standardization of the Ferguson Form Boards is a representative group of normal, urban, school children.

2. The directions used by previous investigators for the administration and scoring of this test have been shown to be inadequate, while the procedure adopted in the present standardization was found to be satisfactory for the administration of the test.

3. Two methods of scoring, namely, score (units/time) and time, were found to be equally effective, as judged by statistical treatment of the data, but score is considered the preferable index of performance.

4. Norms are presented for both score and time. While norms are presented for separate sexes, these norms are to be considered tentative.

5. The test has been found to be an effective method of discriminating behavior between ages 6 to 15, inclusive, and between grades 2 to 8, inclusive. The distribution of the norms indicates that the discriminative capacity of the test may not be restricted to these limits.

6. The test measures some component of development which appears to be more closely related to that measured by verbal

tests than is the case with some other performance tests.

7. The reliability of the test has been indicated.

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A STUDY OF SENSE OF HUMOR: ITS RELATION TO SEX, AGE AND PERSONAL CHARACTERISTICS

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GEORGE BERNARD SHAW advised a writer on the subject of humor to go to a sanitarium, with the injunction, "There is no more dangerous literary symptom than a temptation to write about wit and humor!" In spite of Mr. Shaw's antipathy for an analytical study of "why we laugh," a growing interest in the subject is showing itself among students of literature and psychology even at the sacrifice of literary achievements or at the exposure of a defective sense of humor of the investigator! A few famous names are represented among the contributors to the theories of humor: Plato, Aristotle, Hobbes, Kant, Coleridge, Bergson, Max Eastman, Stephen Leacock and Carolyn Wells. Many other lesser lights have given experimental evidence on additional aspects of the subject.

No one theory can explain all of the factors involved in a humorous situation, dependent as it is upon stimulus, occasion and condition of the responding subject, but some interesting viewpoints may be given. In his definition of laughter, Thomas Hobbes (6) enlarged upon Aristotle's theory of "superiority" as the trait in the recipient of a successful joke: "The passion of laughter is nothing else but sudden glory arising from a sudden conception of some eminency in ourselves, by comparison with the infirmity of others, or with our own formerly."

Many comical situations are explained by Carolyn Wells' (12) analysis of humorous stimuli: "It is the ridiculous dis-

comfiture of another that makes a joke, not the serious accident." She illustrates with the classical joke—if a fat man slips on a banana peel and lands in a mud puddle, the response from onlookers is uproarious; but if he breaks his leg the incident is a tragedy and is responded to as such.

Plato's "frustration" theory receives refinement in Kant's (8) words: "Laughter is the affection arising from the sudden transformation of a strained expectation into nothing."

The unhappy theme of failure dominates the humor theory of Bruère (2): "Wit and humor feed on failure as well as on success; their nutriment is absurdity, incongruity and conflict no less than satisfaction, security and peace."

A neat phraseology of one common joke structure is credited to Samuel Coleridge (3) who wrote that wit and humor are intellectual operations which detect "difference in similar" and "identity in dissimilar things," the connection of which may be by words, thoughts or images. Upon the basis of reason Coleridge attributes only to "the vulgar" the enjoyment of watching ludicrous antics of animals along with the physical clowning acts of man. Bergson (1) modifies this insult to our sense of humor by saying, "The comic does not exist outside the pale of what is strictly human." Hence, the animal is amusing to the extent to which its behavior resembles that of man.

McCrary (10) gives to the sense of humor a physical-psychological interpretation: "I am under the impression that humor is evidence of vitality—of a well-balanced personality, that the most humorous people are the most intelligent, the most spirited, and the bravest."

The explanation of laughter expanded at length by Hayworth (5) is "that laughter was originally a vocal signal to other members of the group that they might relax with safety. . . . It was a natural development from laughter that when primitive man was within sight of his fellows he should come to use the smile as a signal." The theory perhaps suggests primitive causation of laughter but is it useful in accounting for levels of humorous stimuli?

The core of a college course in the appreciation of humor is offered by Leacock (9): "Teaching humor would not mean teaching people to make fun of things, but teaching people to understand things. . . . Humor at its highest is a part of the interpretation of life." He adds that "Laughter is the mere beginning of humor, both in time and significance. The end, the final reach, is nearer tears." The frequency with which humor feeds on misfortune is evidence of the hair line between joy and sadness.

In an unpublishd dissertation on "Dynamic Factors in the Psychology of Humor," Dr. Richard N. Sears, of Harvard University, analyzes the structure of a joke as a relatively complex Gestalt. "To comprehend humor, the mind must effect the closure of two incompatible tendencies directed at probably antipodal closures." Three aspects of the humor situation are discussed: (1) The schema—the original closure tendency, the subsequent dislocation or turning point, with the consequent sudden juxtaposition of a secondary closure tendency; (2) The thema—the pattern of action including both an end result and the activity leading up to it; (3) The humor-entities—persons, places, objects or abstractions. Between these and the subject there exist affective relations dependent on the past life. Sears demonstrates that the isolation of any one of these three factors affects adversely the intensity of the mirth response.

Kambouropoulou (7) studied the sense of humor among one hundred Vassar College students, using seven-day diaries of humorous incidents as the source of data. She found the appeal of "superiority" a greater contributory factor to humor than "incongruity" of ideas, and the higher the degree of introversion in the student, the greater was the popularity of the former type of joke. The author states that the experimental situation detracts from the humorous response produced by spontaneity. The test for recall reveals that those jokes which suggest situations capable of arousing empathy or visualization are more easily retained than jokes presenting abstract ideas. The subjects did not remember all of the jokes

judged by themselves to possess the highest degree of humor, nor only the jokes considered best. Kambouropoulou reports a positive relation between academic standing and the number of humorous experiences recorded by her subjects, which finding, however, may indicate either a better sense of humor in the brighter student, or more thoroughness and conscientiousness in reporting experiences.

The question of introducing humor in grade school literature finds pertinent experimental data in the work of Tarrant (11) who condemns the too early presentation of the works of some of our greatest humorists with consequent want of appreciation, and loss of freshness when the immature child becomes more advanced in his understanding. The grade school child secures his fun from direct personal observation. The young boy, according to Tarrant, has a more highly developed sense of humor than the girl; at an earlier date he begins to appreciate humor in verbal stimuli.

An investigation by Ruth Wells (13) of the tastes of junior and senior high school students in humorous literature raises a question concerning the relation between maturity and sense of humor. The study suffers from the subjectivity inherent in most reports on humor experiments in that the initial classification of jokes is somewhat arbitrary. She found the following order of preference for jokes indicated by 65 students in the seventh grade, 44 in the ninth and 64 in the twelfth: absurdity, slapstick, satire and whimsy. To the credit of the high school seniors—there was a leveling process in the decreased popularity of absurdity and slapstick with an increased interest in satire and whimsy, although the relative order remained the same as for the lower grades.

The pun meets its test in the present study. To its defense, historically, Leacock states that it took first honors among verbal devices of 19th century humor. The good pun suggests a facile use of words with the ability of broad interpretation. Leacock points to the joy of the child in the realization of a new connotation with the parallel pleasure derived from the

conscious misuse of language. Kambouropoulou also comes to the rescue of the pun with her observation that students of high scholastic rank were more likely to make puns than were those of low standing. Sears believes that a superior intelligence may be responsible for most clever puns but the punster gains his pleasure from originating a pun, not from hearing one.

We speak glibly of a sense of humor—that which no one can satisfactorily define, that which is a primary social asset. Max Eastman gives due honor to the trait in saying, "Laughter is, after speech, the chief thing that holds society together." We are more reluctant to admit a defective sense of humor than a poor ear for music, a lack of physical skill or endurance, or even an inferior intelligence. So coveted and broad is the trait that to say a person has a good sense of humor is almost synonymous with, "He is intelligent; he is a good sport; I like him immensely."

By common observation we are impressed by the subjective nature of a study of sense of humor and by the importance of elements apart from the humor stimulus—the time and place, the previous experience and knowledge of the subject, and his physical and mental set. All of these factors cannot be controlled in an experimental situation, nor can the response of one subject be accurately measured or compared with the reaction of another.

The present study does not surmount the aforementioned difficulties. It makes no claim to the measurement of sense of humor nor does it rule out all subjective factors. It offers a comparison of humorous tastes of groups of people having certain characteristics in common, such as: age, sex, education, etc. The study is based on data gathered from students who answered the following questionnaire. Inasmuch as the questions relate to personal attributes or preferences rather than right and wrong responses, the reader may wish to compare his responses with those of the various groups.

JOKES

After reading all of the following jokes, rank them in the order in which they are humorous to you. If you choose No. 4

Self Analysis

Directions: Estimate your position in your class with respect to each trait. If you are a freshman in college, compare yourself with the average of the freshmen in college and place an (X) in the appropriate column before each trait. Rate yourself as accurately as possible. *Always judge yourself by the average of your class.*

Low	Below	Average	Above	High	
					1. Tendency to laugh at a good joke told by someone whom you dislike. (If you believe that you possess this trait in the extreme, place an (X) in the column headed "High." If you believe you are slightly below average, place an (X) under "Below," etc.)
					2. Tendency to be a good mixer in social groups.
					3. Ability to feel at ease while telling a joke.
					4. Tendency to consider whether your listeners will disapprove of, or be offended by the joke which you tell.
					5. Possession of a sense of humor.
					Always judge yourself by the average of your class.
					6. Possession of a cheerful disposition.
					7. Tendency to laugh at a joke on yourself when someone else calls attention to it.
					8. Ability to improve upon jokes which you have heard.
					9. Tendency to pun.
					10. Ability to understand the point of a joke.
					Always judge yourself by the average of your class.
					11. Tendency to accept an unconventional joke without being shocked.
					12. Possession of general intelligence.
					13. Tendency to be a "good sport."
					14. Tendency to permit others to poke fun at the jokes you tell without your feeling offended.
					15. Ability to create for others a humorous story out of an actual experience.
					Always judge yourself by the average of your class.
					16. Tendency to laugh during very solemn, serious affairs.
					17. Tendency to be healthy.
					18. Tendency to be overweight.
					19. Tendency to sleep well.
					20. Possession of a good appetite.
					Always judge yourself by the average of your class.
					21. Tendency to enjoy a clever dirty joke.
					22. Tendency to enjoy a good pun.
					23. Tendency to enjoy a good Scotchman joke.
					24. Tendency to enjoy movie comedies with human movie stars.
					25. Tendency to enjoy Mickey Mouse, Aesop Fables, etc. in the movies.
					26. Tendency to enjoy the funny papers.

as the best joke, rank it (1), if No. 8 is next best, rank it (2), etc. Indicate the rank of each joke on the line at the left. Place an (X) before any so-called "joke" if you do not see a point in it and do not rank it. Try to rank a joke on its own merits even if you have heard it before.

——1. Customer: "Yes, I know that fish is brain food, but I don't like fish. Isn't there some other brain food?"
Waiter: "Well, yes, there's noodle soup."

——2. "Topsy," said the mistress to the maid, "Just look at this table. Why I can write my name in the dust."
"It must be wonderful," commented the colored maid, "Ah wishes Ah was educated."

——3. A doctor prescribed a blood transfusion for an Englishman who was very ill. Among the friends of the sick man was a Scotchman who offered his blood. After the transfusion, the Englishman sent a note of appreciation and a check for $50 to his friend. The Englishman again fell ill and again the Scotchman gave his blood, for which he was rewarded later by a note of thanks and $25. After apparent health, the patient weakened and once more the Scotchman was called upon for blood. After rallying from his illness the Englishman wrote a letter—a masterpiece of literature—expressing his sincere gratitude to the Scotchman for saving his life.

——4. Pretty girl: "It must have taken a lot of courage to rescue me."
Young man: "Yeah, I had to knock down three other fellows who wanted to do it."

——5. A Scotchman wrote to the editor of a magazine, and said, "If you don't stop putting Scotch jokes in your magazine, I'll stop borrowing it."

——6. Friend: "Your wife seems to be parsimonious."
Husband: "Parsimonious? Why if I suddenly got sick it would take her a week to find it out."

——7. As I staggered up the aisle of the street car I had my eye on a seat, but a woman sat on it.

——8. Letter to Time Magazine:
Sirs:

I was greatly interested in the article "Facts of Birth" under the general heading "Medicine" in the current issue of Time.

Modern medical knowledge to the contrary, it is my observation that the great majority of mothers firmly believe that a child may be deformed before birth by a physical or mental shock to the mother. I have heard of a great many examples where a child was deformed after a severe shock during pregnancy. The following example came under my observation and I relate it to you substantially as it occurred.

An expectant mother was living in a public boarding house in a small town in the eastern part of North Carolina several years ago. Her room was on the second floor of the house. There was only one bath which was used by all of those who occupied the second floor. One afternoon, the woman went to the bathroom to bathe. When she opened the door she saw a naked man in the tub which experience caused her extreme fright. Three months later her baby was born without any clothes on. Paul Ervin

—9. They all laughed when she sat down at the piano to play. Do you know why? Because there wasn't any piano stool.

—10. Thank goodness! If there is another revolution, the daughters won't be few enough to be snooty.

—11. A co-ed took the photograph of her boy friend to bed with her—and now she has paper dolls.

—12. A "kiss" is a noun though generally used as a conjunction. It is never declined and is more common than proper. It is not very singular and is generally used in the plural. It agrees with me.

PROCEDURE

The subjects, numbering approximately 600 students, represent schools of diversified types, described as follows:

Two eastern co-educational universities
One southern college for girls
One middle-western co-educational university
One eastern junior college for girls
One middle-western high school

The jokes were not selected according to the humorous taste of the author! They were chosen from current magazines and from favorite jokes contributed by students. Obviously, they were not revised to meet the highest literary standards but appear in their original, popular and sometimes crude forms. Although the author does not attempt to rank them in order of humor it will probably be clear to each reader that there are decided differences in humorous levels and content. The so-called jokes are intended to cover a wide range—to include two puns of differing degrees of humor, likewise two Scotchman jokes, a joke produced by faulty English construction, a "shady" joke and a few lines with no intended point whatsoever—No. 6. The shady joke scarcely plays its intended rôle but even these harmless words were the cause of the questionnaire's rejection by five high school principals!

For convenient identification we shall allude to the jokes by the following key phrases:

1. Noodle soup
2. Topsy
3. Blood transfusion
4. Courage-to-rescue
5. Scotch jokes
6. Parsimonious
7. Eye-on-a-seat
8. Pre-natal conditioning
9. Piano stool
10. D. A. R.
11. Paper dolls
12. Kiss

The students were requested to rank the jokes in humor from one to twelve, marking (X) beside a joke which did not have a point. To provide for a modicum of intellectual honesty, the students were assured that their identity would not be checked, and when the subjects were known by the experimenter no names were requested. When X's appeared on a questionnaire, the number of ranked jokes obviously extended from one to some figure between one and twelve. In order to assure that the highest and lowest choices were assigned constant values and that the intermediate choices received relatively corresponding rating, the joke of lowest rank was arbitrarily reranked as twelve and the higher ranking jokes were given appropriate places between one and twelve.

RESULTS

A. Ranking of Jokes

1. *Choice of jokes*

The point average of each joke and its relative position in rank follow. High degree of humor is denoted by low figures.

JOKE	RANKING OF JOKES BY 425 STUDENTS	
	Point Average	Rank Order
1. Noodle Soup	7.05	8
2. Topsy	6.32	6
3. Blood transfusion	6.39	7
4. Courage-to-rescue	7.86	10
5. Scotch jokes	5.58	4
6. Parsimonious	9.17	12 (least humorous)
7. Eye-on-a-seat	5.79	5
8. Pre-natal conditioning	4.67	1 (most humorous)
9. Piano stool	7.19	9
10. D. A. R.	8.13	11
11. Paper dolls	4.80	2
12. Kiss	5.49	3

The point differences indicate that no joke was consistently ranked as best, the average being 4.67 for the "pre-natal conditioning" joke rather than a nearer approach to "one"; nor did the group give unanimous agreement that the "parsimonious" joke, though apparently pointless, was the poorest in the group. However, the difference between 4.67 and 9.17 is large enough to suggest a tendency of the subjects to prefer one joke to another, with wide individual variations.

2. *Pointless jokes*

The directions do not indicate how many jokes, if any, are intentionally lacking in humorous elements. Consequently the number of X's on the papers ranges from zero to five. The following table gives the per cent of students who marked each joke with an X to signify "no point."

Two-thirds of the subjects ranked the "parsimonious" joke as having a point, a response analogous to the common tendency to laugh at something which one believes should be funny although he fails to see the point. Probably many students

JOKE	PER CENT OF 425 STUDENTS MARKING JOKES POINTLESS
1. Noodle soup	4.8
2. Topsy	1.9
3. Blood transfusion	15.4
4. Courage-to-rescue	3.3
5. Scotch jokes	2.8
6. Parsimonious	33.4
7. Eye-on-a-seat	5.0
8. Pre-natal conditioning	1.9
9. Piano stool	2.4
10. D. A. R.	21.3
11. Paper dolls	3.1
12. Kiss	2.8

thought that they would understand the joke if they knew the meaning of "parsimonious." But those who reasoned this way labeled the joke as the poorest of the twelve. The "D. A. R." joke failed to be meaningful to one-fifth of the subjects, while "blood transfusion" escaped the comprehension of 15 per cent. It seems incredible that none of the jokes was understood by everyone!

3. *Preference of jokes by sex*

The sex differences in choice of jokes gave some interesting, though not startling data. The high school groups tended to favor "paper dolls" much more than did the college groups, but only in the case of the secondary school boys did it rank first. The "kiss" won more votes from girls than from boys while "eye-on-a-seat" found more popularity among the latter. "Pre-natal conditioning" loomed highest in the preference of all groups except the college men. The distribution did not suggest agreement due to sex or age; rather, the scattering indicated that each joke was rated best by a considerable number of students.

4. *Preference of jokes by ages*

The number of subjects in each age group is not adequate for statistical purposes, but rough tendencies may be of interest in several instances. "Topsy" was definitely preferred by the

older group, the rank order clearly correlating with age. Likewise, the older subjects favored the "blood transfusion" joke, though not so strikingly. A correlation with age—or possibly more truly with education—was found in the preponderance of students above 22 years of age who enjoyed the "D. A. R." joke. The shady one appealed most to the later adolescent group, from 15 to 19 years, and the "kiss" was of similar interest to this teen-age group. Do the older students show more elevated tastes in humor?

B. Self-rating on Personal Traits and the Relation Between Traits and Joke Preference

1. *Average self-rating of personal traits*

Assuming that certain personal traits which may be related to a sense of humor follow a normal distribution curve, we attempted to ascertain whether the students' self-ratings give a typical distribution and whether the central tendency is above or below the hypothetical average. According to the directions preceding the questionnaire of traits, each subject was requested to judge himself "by the average of his class." Assigning numerical values to each degree of the trait, the writer found the averages from the following weighted plan:

Low —1
Below average—2
Average —3
Above average—4
High —5

Theoretically, the average for all students on each trait should approximate "3." The following table gives the actual mean for each trait for 599 students.

"Possession of a sense of humor" came within one one-hundredth of a point of equaling "possession of a good appetite" as the trait receiving the highest general average. It is readily apparent that there is a tendency to over-rate oneself in sense of humor and in traits which contribute or predispose to an appreciation of humor. Only 1.4 per cent of the total

	TRAIT	AVERAGE SELF-RATING OF 599 STUDENTS
1.	Tendency to laugh at a good joke told by someone whom you dislike	2.87
2.	Tendency to be a good mixer in social groups	2.87
3.	Ability to feel at ease while telling a joke	2.83
4.	Tendency to consider whether your listeners will disapprove of, or be offended by the joke which you tell	3.06
5.	Possession of a sense of humor	3.53
6.	Possession of a cheerful disposition	3.27
7.	Tendency to laugh at a joke on yourself when someone else calls attention to it	3.19
8.	Ability to improve upon jokes which you have heard	2.45
9.	Tendency to pun	2.64
10.	Ability to understand the point of a joke	3.49
11.	Tendency to accept an unconventional joke without being shocked	3.49
12.	Possession of general intelligence	3.15
13.	Tendency to be a "good sport"	3.00
14.	Tendency to permit others to poke fun at the jokes you tell without your feeling offended	2.95
15.	Ability to create for others a humorous story out of an actual experience	2.97
16.	Tendency to laugh during very solemn, serious affairs	2.93
17.	Tendency to be healthy	3.47
18.	Tendency to be overweight	2.29
19.	Tendency to sleep well	3.46
20.	Possession of a good appetite	3.54
21.	Tendency to enjoy a clever dirty joke	3.06
22.	Tendency to enjoy a good pun	3.43
23.	Tendency to enjoy a good Scotchman joke	3.16
24.	Tendency to enjoy movie comedies with human movie stars	3.25
25.	Tendency to enjoy Micky Mouse, Aesop Fables, etc., in the movies	3.33
26.	Tendency to enjoy the funny papers	2.96

group rated themselves below average while 25 per cent rated themselves in the highest category—very superior!

In spite of propaganda which seeks to degrade the pun, the group rated good puns above clever dirty jokes, good Scotchman jokes, movie comedies, Mickey Mouse and funny papers. Perhaps the pun will petition for proper recognition once more among the elements of humor! The correspondence between enjoyment of good puns and the punning facility was not as close as might be expected.

2. *Best and poorest jokes selected by students who ranked themselves "5" (high) in possession of sense of humor.*

Of the total number of students who answered the questionnaire, 25 per cent gave themselves the highest possible rating on "sense of humor." A study of the best and poorest jokes selected by these self-rated superiors gave interesting comparisons with the total group.

JOKE	PER CENT OF 138 SELF-RATED "HUMOROUS" STUDENTS SELECTING:	
	Best Joke	Poorest Joke
1. Noodle soup	3	2
2. Topsy	3	9
3. Blood transfusion	9	12
4. Courage-to-rescue	0	10
5. Scotch jokes	6	2
6. Parsimonious	1	19
7. Eye-on-a-seat	13	7
8. Pre-natal conditioning	30	3
9. Piano stool	5	8
10. D. A. R.	4	12
11. Paper dolls	23	9
12. Kiss	4	6

There was some logical tendency for the jokes which received the highest number of votes as "best" to receive a low number as "poorest." However, all except the "courage-to-rescue" joke received at least one vote *for both the best and the poorest* —and these votes represent students who consider themselves abundantly endowed with a sense of humor!

3. *The relation between "the tendency to enjoy a good pun," "tendency to pun" and the students' rating of puns in the questionnaire.*

The "noodle soup" and "kiss" jokes are both puns. We will recall that the total group gave the former an average point rank of 7.05 and the latter a rank of 5.49, the smaller figure representing a higher degree of humor. The students, numbering 106, who were especially fond of good puns, as indicated by a "5" rating, saw slightly less humor in "noodle soup"

(7.13) and the "kiss" (6.11)—apparently regarding them as inferior puns. Five of these students did not see the point in "noodle soup!"

The skilled punsters (self-rating of "5" in "tendency to pun"), numbering 38, gave "noodle soup" a point average of 6.67 and "kiss" an average of 5.50. One cannot draw any reliable or definite conclusions from the comparison between the above traits and the relative ranking of puns. The puns did not gain nor did they lose significantly when ranked by the punsters and those who favored puns.

4. *The relation between the "tendency to enjoy a clever dirty joke" and the ranking of "paper dolls."*

Does a preconceived preference for or a dislike of a shady joke influence the ranking of such a joke? Apparently the group of 90 subjects who thought themselves unusually appreciative of clever dirty jokes (self-rating of "5") gave "paper dolls" an average point rank of 3.55, showing a greater preference for this joke than did the total group (4.80) while those who were unusually averse to such jokes gave the shady joke only 9.07. Five of the latter group of 18 students did not see the point of the joke.

A mental set with respect to shady jokes undoubtedly affects one's enjoyment of the same. The success of a joke depends as much upon the responding subject as upon the content of the joke—as Shakespeare observed in "Love's Labor Lost":

> "A jest's popularity lies in the ear
> Of him who hears it, never in the tongue
> Of him who makes it."

CONCLUSIONS:

1. When twelve heterogeneous jokes were ranked with respect to humor by over 400 students of high school and college, no joke was consistently marked "best" or "poorest."

2. Each joke was marked "pointless" by at least one student. Only one-third of the subjects marked the "joke" which was designed to be pointless, as such.

3. Adolescent boys showed a significantly greater liking for the "shady" joke than did the girls of the same age and the older college students.

4. Several jokes quite consistently received higher ratings by the older group of students; *e.g.* the D. A. R. joke contributes an element more inherently humorous to older and more educated readers.

5. There was a tendency for students to rate themselves high on:

Possession of a sense of humor
Ability to understand the point of a joke
Tendency to accept an unconventional joke without being shocked
Tendency to enjoy a good pun

Only one per cent rated themselves below average in sense of humor.

6. Every joke was ranked as "best" and "poorest" by at least one student who ranked himself very superior in sense of humor. The averages differed little from those of the total group.

7. The appreciation of puns and the punning facility were not related to the evaluation of puns in the questionnaire.

8. The rank given to the shady joke in the questionnaire was raised or lowered by a positive or negative mental attitude towards shady jokes.

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APPARATUS FOR MEASURING VISUAL ACCOMMODATION TIME TO LIGHT AND TO DARKNESS

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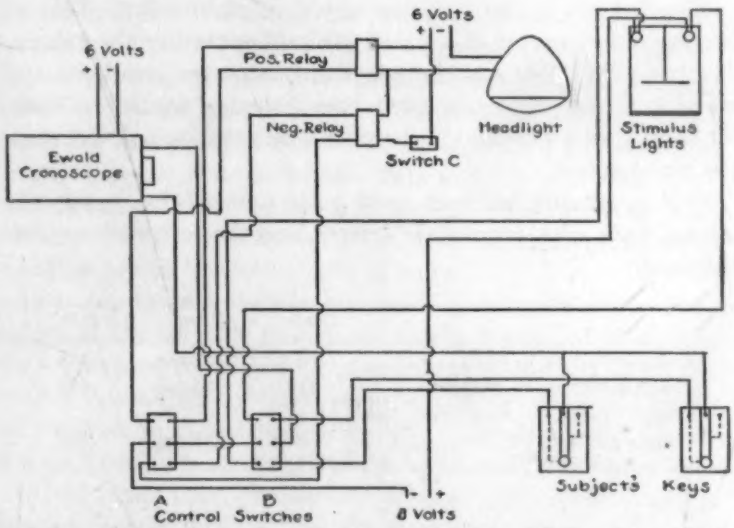
THE apparatus measures visual accommodation time from light to darkness, and from darkness to light. The intensity of the light is held constant at 8.5 foot candles. If the cells which supply current for the headlight are kept constantly charged to a specific gravity of from 1.225 to 1.250, the intensity of the light will remain constant or very nearly so. The measurement of time is made with an Ewald chronoscope. (See accompanying diagram.)



Scheme of apparatus for measuring visual accommodation time to light and to darkness.

The light is produced by a standard 1936 Ford V-8 headlight equipped with a 32-candle-power bulb. The light is focused directly into the subject's eyes from a distance of 20 feet. It is necessary to operate the lights with two relays. One relay turns the light on when the subject is accommodating to light, and the other turns the light off when the subject is accommodating to darkness. The change from one switch to the other is made at the control switch A.

The stimulus lights project the letters "L" or "R" on a ground glass in the front of the box containing the lights. The height of the stimulus letters is 1.20 inches. Such letters are visible to persons with vision as low as 28.6 per cent at a distance of 20 feet. Thus the apparatus measures accommodation time and is not dependent upon visual acuity. The subject reacts to the letters by releasing the right or left hand key, depending upon which letter is revealed. The letters always appear at the same place on the ground glass. Selection of the stimulus letter is made by the experimenter with the control switch B.

The current in the stimulus circuit is eight volts. This is necessary because of the added load of operating the relays. The stimulus lights and the relays operating the headlight are wired in series. By using a separate system of wiring for each of the subject's keys an incorrect or false reaction will not stop the chronoscope.

This apparatus has been used quite successfully in experimental work with automobile drivers, and the following results obtained.

	Cases	*Mean*	*S.D.*
Accommodation to light	38	1.461 sec.	.164
Accommodation to darkness	38	.734 sec.	.053
Simple reaction time for the same subjects	38	.233 sec.	.015

THE SUMMER INTERNESHIPS OF THE PSYCHOLOGICAL CORPORATION

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University of Maryland

FOR years, the letterhead of the Psychological Corporation has announced that this organization "conducts consumer surveys on products, advertising, and sales appeals; applies scientific methods to the selection, training and productivity of sales, office, and factory personnel; acts as counsel on the psychological aspects of sales, personnel, and public relations policies." It is obvious that an organization with these aims—and with a nation-wide network of trained representatives—would rapidly accumulate techniques and results of considerable value to the field of industrial psychology. It is, however, equally obvious that, since most of this material was collected in the service of private business organizations, much of it could never be given general publication. This means that, unless some method could be worked out to bridge the gap between non-publishable data and the university psychologist, much technological information—obtained in optimal fashion, that is, in direct contact with business problems—would simply be lost to the field at large.

As a step toward the elimination of such wastage, the Psychological Corporation announced in the Spring of 1937 that it was planning to invite four young psychologists to spend the summer in the offices of the Corporation as 'internes' in a training program in industrial psychology. The group that assembled in New York during the first week in July actually consisted of seven men from seven different universities; and it was this group that devoted the next eight weeks to a continuous seminar-and-laboratory period in direct contact with

past and present activities of the Psychological Corporation.

The members of the group were:

C. N. Allen, Ph.D., Asst. Prof. Psychol., Dartmouth.
L. M. Baker, Ph.D., Assoc. Prof. Psychol., Berea College.
A. C. Welch, Ph.D., Dept. Marketing, Wharton School.
G. W. Williams, Ph.D., Asst. Prof. Psychol., Rutgers.
A. B. Blankenship, M.A., University of Pennsylvania.
T. H. Cutler, M.A., School of Commerce, Denver University.

J. G. Jenkins was nominally 'supervisor'; the autonomy of the group, however, soon obviated the need for such a title. These men were selected from a list of about sixty applications obtained with the cooperation of the representatives of the Psychological Corporation.

A flexible program had been worked out to permit careful study of as wide a range of activities as possible. Although the primary emphasis of this program was in the field of market research, special arrangements were made for those whose interests were chiefly concerned with problems in personality and in vocational guidance. The resident staff of the Psychological Corporation had arranged to be available as tutors and guides to the group of internes while carrying on their regular activities. H. C. Link, P. G. Corby and A. D. Freiberg were available for discussions of market research problems. R. S. Schultz and Rose G. Anderson reported on their work in personnel and clinical fields. G. K. Bennett described the work of the test division. Too much credit cannot be given to these members of the resident staff. In hot weather and under pressure of activity, they were always willing to take time to explain with enthusiasm, to argue with vigor, and to listen attentively to suggestions and criticisms from a group of novices. As a result of their cooperation, the summer group rapidly became an autonomous research unit, conducting a systematic survey of the past and present activities of the Corporation and acquiring basic training in actual contact with current psychotechnological problems.

MARKET RESEARCH PROJECTS

The major emphasis of the summer program had been laid upon the activities of the Psychological Corporation in the field of market research, and to this all-too-unfamiliar field of applied psychology the internes devoted most of their time. Without question, the most important phase of the training in this field consisted in participation in current market studies, and the first weeks of the summer were spent in preparation for this work. By way of preparation these early weeks were spent in reviewing specific market surveys previously completed and already on file, together with appropriate reading in various sources. One week was devoted chiefly to a study and discussion of the manuscript of a six-volume report on copy testing methods, prepared by the staff of the Psychological Corporation for the Association of National Advertisers under the supervision of a jury of psychologists.[1] Another week was spent in reviewing available reports on commercial studies employing consumer-jury and triple-associates methods.

As further preparation for actual participation in current market research problems, a general review of methods of measuring the buying habits of consumers was undertaken. A considerable amount of time was devoted to an analysis of the results of previous Psychological Brand Barometers, together with a consideration of the theoretical basis of the methodology involved. Recent researches upon the reliability and validity of last-purchase questions were reported and discussed in detail by the members of the group. Cognate market surveys by the local staff were brought in to demonstrate the investigation of the characteristics of a commodity, and the evaluation of its advertising by techniques of questionnaire and interview. One special project concerned the novel employment of museum-study techniques in analyzing the behavior of visitors to commercial exhibits. Another dealt with the use of samples

[1] This report, as yet unavailable in printed form, affords the most catholic and the best documented survey of copy testing methods that has ever been made. It will ultimately be published in some form by the Psychological Corporation.

in determining popular reaction to materials for toilet articles. Through the entire section of the program ran the common matrix of concern with adequate preparation of empirically tested questionnaires, proper sampling of respondents, correct presentation of crude statistics for interpretation, and critical analysis in the final interpretation itself. For each step of this process of training the files of the Psychological Corporation and the experience of its resident staff were at the disposal of the interne-group.

With this training as a background, the summer group was then confronted with the problem of assisting in making up, revising, and preparing for use a questionnaire for a market survey then being conducted by the staff for a commercial organization. The original questionnaire was formulated in the course of group discussion; the individual internes then employed these forms in test-interviews; and the group as a whole continued with the process of empirical revision until the questionnaire met the requirements of a thorough pre-testing. The resulting inquiry-blank was then mailed out nationally for use by representatives of the Psychological Corporation at selected universities. As the returns began to come in, the internes were given instruction in coding and tabulating and were then permitted to complete these processes for some of the less routine questions. This, it may be remarked, is a type of training for which no amount of reading in textbooks can provide an adequate substitute.

As an adjunct to the section concerned with market surveys, the various social studies made under the auspices of the Corporation were examined by the group. These studies, it will be recalled, cover a wide range of topics, varying from an analysis of popular reactions to the New Deal to an evaluation of public attitudes towards large business organizations. The New York office of the National Association of Manufacturers contributed to the value of this section of the program by exhibiting to the group a series of films intended to present "The American Way." One afternoon was spent in viewing these films and discussing their psychological aspects.

VOCATIONAL ORIENTATION

Other activities of the Psychological Corporation were represented elsewhere on the summer program. No small amount of time was allotted to a consideration of the Corporation's extensive activities in vocational and educational guidance, including work both with adults and children. Here again reference to the files of previous cases was supplemented by frequent contacts with cases then under consideration. On occasion the raw test-scores and interview-results were presented for group discussion with instructions to arrive at a satisfactory interpretation for presentation to the client. In cases where the recommendation of the group differed from that arrived at by the member of the local staff concerned—and these were few in number—the latter was called in for discussion with the group. Adequate time was provided for inspection of the available stock of psychological tests and scales, as well as for an exposition of the Corporation's policy in refusing to distribute these tests to applicants who lacked psychological training. Several of the internes participated in the actual testing of clients. Opportunities were given to learn of the services of the staff in the field of industrial personnel, with special attention to those organizations for which the staff maintains an integrated program in vocational selection and employee morale.

ALLIED ACTIVITIES

As special activities allied to the main lines of training, trips were taken to Letchworth Village and to Sing Sing Penitentiary. At both institutions arrangements had been made with local psychologists to provide a general review of typical problems and opportunities for research. The time spent in the clinic at Letchworth Village provided an impressive picture of the vast variety of defectives grouped under a few general names. It served to recall to the group the disturbingly large number of psychologists who teach courses in abnormal psychology on the basis of only the most limited con-

tact with abnormal individuals. It dramatized the desirability of bringing those who teach applied psychology into frequent contact with the actual raw materials with which their courses are concerned. Because contacts of this sort are especially rare in the realm of business and industry, such a development as the summer interne program of the Psychological Corporation becomes a very genuine contributor to the progress of a sound psychotechnology. It is to be hoped that the psychologists of the country will take an active part in encouraging the Psychological Corporation to make this summer training program a regular part of its activities.

PLANS FOR SUMMER OF 1938

The Psychological Corporation office was permitted to see Dr. Jenkins' report and wishes to express thanks to him for his help in making the plan a success. Dr. Jenkins was engaged especially to supervise this course, because it was felt that the full time attention of a competent instructor was essential, and also because of his familiarity with the work of the Corporation through his extensive participation in its projects.

Application blanks for psychologists who wish to be considered for an interneship the summer of 1938 may be obtained by writing directly to the Psychological Corporation, 522 Fifth Avenue, New York, New York. In requesting such applications, reference should be made to the representative who will endorse the application or to the head of a department of psychology who will endorse such an application. With few exceptions only psychologists who have obtained their Ph.D. in psychology and who have shown some previous interest in the field of applied, or have had experience in this field will be considered. In special instances, psychologists who have not quite finished their Ph.D. work will be considered. Primary consideration is personality, that is the ability to engage in situations which require social initiative, experience in group activities such as the extra curricula athletic and social activities of a school and practical experience in self-supporting work of almost any kind.

NEWS AND NOTES

THE AMERICAN ASSOCIATION OF APPLIED PSYCHOLOGISTS

Some 400 psychologists interested in applications met in Minneapolis during the two days preceding the A.P.A. and formed an association with the above provisional name and substantially in accord with the proposals published by the National Committee in THE JOURNAL OF APPLIED PSYCHOLOGY, 1937, *1*, 14–16.

The basic purpose of the new organization is to promote sound and scientific applications of psychology in every possible way. While at Minneapolis the Association offered a program of research papers and round table discussions in applied psychology, it is the hope of the organizers that the Association will be an active working group. It should promote proper standards of training and professional competence and should increase the opportunities for psychology to be of direct service to society.

The following officers were elected:

DOUGLAS FRYER, *President.*

HORACE B. ENGLISH, *Executive Secretary.*

EDWARD B. GREENE, *Treasurer.*

Section of Clinical Psychology: ANDREW W. BROWN, *Vice-President,* C. M. LOUTTIT, *Secretary.*

Section of Consulting Psychology: RICHARD H. PAYNTER, *Vice-President,* EDITH M. ACHILLES, *Secretary.*

Section of Educational Psychology: PERCIVAL M. SYMONDS, *Vice-President,* ALVIN C. EURICH, *Secretary.*

Section of Industrial and Business Psychology: HAROLD E. BURTT, *Vice-President,* MARION A. BILLS, *Secretary.*

Chairman, Board of Affiliates, JAMES Q. HOLSOPPLE.

The Association of Consulting Psychologists officially voted to disband and very generously turned over to the new Association its records and its assets, including a considerable sum of money and the *Journal of Consulting Psychology* which becomes the official journal of the Association. The Clinical Section of the A.P.A. also voted to disband and turn over its treasury to the new group. While it is expected that former members of these two groups will in most cases join the new Association, their membership is not automatically transferred and affiliation with the A.A.A.P. must be directly sought.

The following requirements for Charter Membership were adopted after

a spirited and prolonged discussion: "Membership is by election of the Executive Council upon application of the candidate and recommendation of two sponsors.

(F) Fellow, with Ph.D. or equivalent degree or certificate of training in psychology or applied psychology, and either, (a) Experience: four years practice in the application of psychology as a science, largely under own guidance, or (b) Research: systematic published research of significant value in the applications of psychology beyond the doctoral dissertation. For the present an equivalent for the doctorate may be accepted at the discretion of the Council, defined as two or more years of directive or supervisory practice in addition to the four years required under (a) above.)

(A) Associate, with Ph.D. or equivalent degree or certificate of training in psychology or applied psychology and one (1) year practice in the application of psychology under the direction of a psychologist with qualifications of a Fellow. (For the present an equivalent for the doctorate may be accepted at the discretion of the Council defined as two or more years of practice largely under own guidance in the application of psychology in addition to one year required above.)

Both Fellows and Associates will vote on the business of the American Association; only Fellows may hold office in the Council."

Section membership requires membership in the Association but each Section makes such further provision as seems best. Forms for application for membership may be obtained from the Executive Secretary or from the Regional Representative of the Charter Membership Committee. This committee consists of the following persons: General Chairman, Morris Viteles, University of Pennsylvania; E. M. Baylor, Maine, New Hampshire and Vermont; R. A. Young, Eastern Massachusetts; D. Shakow, Western Massachusetts; M. A. Bills, Connecticut; H. N. DeWick, Rhode Island; J. W. Dunlap, Upper N. Y. State; E. M. Achilles, Lower N. Y. State; J. D. Jackson, New Jersey; J. E. W. Wallin, Delaware; R. A. Brotemarkle, Eastern Pennsylvania; B. V. Moore, Western Pennsylvania; B. M. Luckey, Northern Ohio; R. S. Uhrbrock, Southern Ohio; A. W. Kornhauser, Illinois; H. F. Adams, Michigan; R. W. Husband, Wisconsin; D. G. Paterson, Minnesota; C. M. Loutitt, Indiana; J. B. Miner, Kentucky; S. C. Garrison, Tennessee; F. A. Moss, Virginia, West Virginia, and Washington, D. C.; C. L. Shartle, Maryland; K. C. Garrison, North and South Carolina; J. E. Bathurst, Georgia, Florida, Alabama and Mississippi; J. V. Yarborough, Louisiana, Texas, Arkansas and Oklahoma; B. A. Nash, Kansas; H. Meltzer, Missouri; A. J. F. Cross, Nebraska; H. V. Gaskill, Iowa; G. T. Avery, Colorado, Montana and Dakotas; V. E. Fisher, Idaho, Utah, Nevada and Wyoming; R. H. Seashore, Oregon and Washington; H. E. Jones, Northern California; D. G. Humm, Southern California; C. C. Dove, New Mexico and Arizona; W. E. Blatz, Eastern Prov., Canada; J. F. Marsh, Western Prov., Canada; S. D. Porteus, Hawaii.

The following professional committees already appointed and in most cases at work give some indication of the direction which the activities of the Association may take:

1. Committee on Applied Instruction in Colleges and Secondary Schools.
   Purpose: Survey and plan instruction in applied psychology in colleges and secondary schools.
   E. R. Henry (chairman), F. N. Freeman, T. E. Newland, J. G. Jenkins, R. A. Davis, E. B. Royer.
2. Committee on Applied Journals.
   Purpose: Development of coordinate procedure in publishing and editing journals of applied psychology.
   J. P. Porter (chairman), composed of editors of all applied journals.
3. Committee on Dissertations in Applied Psychology.
   Purpose: To establish precedent for meritorious M.A. and Ph.D. dissertations in applied psychology.
   A. T. Poffenberger (chairman), F. N. Freeman, L. S. Hollingworth, F. N. Maxfield, E. R. Wood.
4. Committee on Graduate Instruction in Applied Psychology.
   Purpose: Survey and plan graduate instruction in applied psychology.
   F. N. Freeman (chairman), H. E. Burtt, Douglas Fryer, A. T. Poffenberger, F. L. Wells.
5. Committee on Professional Employment.
   Purpose: Development of placement procedure and standards of placement for applied psychologists.
   Robert Hoppock (chairman), K. M. Cowdery, J. G. Darley, C. H. Griffitts, Elaine Kinder, E. D. Partridge, C. L. Shartle, L. A. Thompson, E. G. Williamson.
   (The Association has taken over the representatives of the A.C.P. on the Joint Committee on Unemployment of the Psychologists League, the A.C.P. and the A.P.A.)
6. Committee on Professional Ethics.
   Purpose: Establish and maintain a code of professional ethics for applied psychologists included recommended action concerning infraction of the code.
   W. W. Coxe (chairman), E. A. Doll, G. M. Fernald, Douglas Fryer, F. A. Kingsbury, D. G. Paterson, Gladys Tallman.
7. Committee on Standardized Tests.
   Purpose: Planning, editing and arranging for publication of standardized tests in applied psychology.
   H. E. Garrett (chairman), Grace Arthur, J. W. Dunlap, E. B. Greene, M. A. Merrill, E. K. Strong, E. R. Henry.
8. Committee on Technical Exhibits.
   Purpose: Establish and maintain technical exhibits in applied psychology for the education of the lay public.

R. H. Paynter (chairman), T. R. Garth, F. Kuhlmann, J. H. Williams, M. R. Trabue.

9. Committee on Technical Manuals.
   Purpose: Planning and arranging for outside publication of technical manuals in applied psychology.
   H. A. Toops (chairman), H. A. Edgerton, A. K. Kurtz, C. C. Peters, L. L. Thurstone, D. A. Worcester.
10. Conference on Professional Relations.
    Purpose: To establish and maintain advantageous relations between applied psychologists as a profession and other professions.
    D. G. Paterson (chairman), E. F. Kinder, Secretary.
    Conference of professional relations to be scheduled at annual meeting for report of subcommittees and recommendation at "Conference of Professional Committees."
    a. Committee on Relations with Educational Profession.
       S. L. Pressey (chairman), F. L. Goodenough, C. W. Hall, C. H. Smeltzer, P. M. Symonds, B. J. Johnson, C. E. Skinner.
    b. Committee on Relations with Engineering Profession.
       H. C. Link (chairman), R. G. Anderson, W. V. Bingham, H. E. Burtt, E. K. Strong, L. M. Gilbreth, M. S. Viteles.
    c. Committee on Relations with Medical Profession.
       F. L. Wells (chairman), A. W. Brown, F. N. Maxfield, J. B. Miner, F. A. Moss, Emmett Schott, C. H. Town.
    d. Committee on Relations with Social Workers Profession.
       E. A. Cowan (chairman), L. Ackerson, E. Burr, M. B. Jensen, E. H. Johnson, W. P. McElroy, Z. C. O'Connor, C. H. Town, M. Vanuxem, M. L. Warner, D. P. Wilson.
11. Committee on Working Conditions.
    Purpose: To investigate working conditions of applied psychologists concerned with the efficiency of work with a view to recommendation.
    E. L. Kelly (chairman), H. C. Bingham, P. S. Achilles, R. C. Challman, K. M. Cowdery.

The Midwestern Psychological Association will hold its thirteenth annual meeting at the University of Wisconsin, on Friday and Saturday, April 22 and 23, 1938, under the Presidency of Dr. Arthur G. Bills. A special invitation is extended especially to qualified graduate students in the universities in the midwestern area to become members of the Association. The only requirements for membership are (1) that the candidate be a member or associate member of the American Psychological Association, or (2) he must be recommended by some member of the M. P. A. and passed upon by the Council, and an appli-

cation blank must be filed with the Secretary in quintuplicate by March 1, containing a statement concerning the candidate's academic qualifications, type of psychological work engaged in, and publications, if any.

Members are urged to plan their papers early and to submit in quadruplicate an abstract of not more than 200 words not later than February 10, 1938, to the Secretary, J. P. Guilford, University of Nebraska, Lincoln, Nebraska.

The Fifth Annual Conference on Business Education, to be held on June 30 and July 31, 1938, at the School of Business, University of Chicago, will have for its general theme: "Business as a Social Institution." The first day of the conference will be devoted to interpretations and amplifications of the concept; that is, just what does business as a social institution mean to business and industry, to labor, to the layman, and to educators? The second day will be devoted to the responsibilities of education for the development of integrated experiences for effective participation in business as a social institution. Each session will be followed by discussion, questions and comments. Outstanding speakers in each field represented will appear on the various programs. Further information may be secured from Miss Ann Brewington, of the Conference Committee, School of Business, University of Chicago.

Through the cooperation of the Delaware Citizens Association and the Department of Special Education and Mental Hygiene of Delaware, Dr. J. E. W. Wallin, Director, this year has two psycho-educational examiners for service in the state schools in addition to one examiner for the Wilmington Schools. Dr. Wallin has been reappointed as a member of the Committee on Equal Opportunity of the National Education Association and has also been appointed by the Governor of Delaware to membership in the Delaware Swedish Tercentenary Commission and the Constitution Sesquicentennial Commission of Delaware. During the summer term of 1938 Dr. Wallin will return to Duke University as visiting professor in the field of mental retardation and deviation, personality maladjustment and mental hygiene.

At the meeting of the Section of Psychology of the New York Academy of Sciences on October 18, 1937, Dr. Irving Lorge, of Teachers College, Columbia University, was elected chairman to succeed Dr. Jack Dunlap, of the University of Rochester, and Dr. Anne Anastasi, of Barnard College, was elected Secretary.

From December 6 to 11, 1937, a Conference on Labor Relations by the Personnel Research Federation in joint session with the American Society of Mechanical Engineers and the Society for the Advancement of Management was held at Hotel New Yorker and Engineering Societies Building, New York City. Prominent representatives from industry, psychology, labor and engineering appeared on the programs throughout the week. Dr. Richard S. Schultz, of the Psychological Corporation, spoke on the subject "Psychological Methods in Labor Relations." "Morale Factors as Incentives" was discussed by Dr. Ordway Tead. The Society for the Advancement of Management is a merger of the Taylor Society, Inc., and The Society of Industrial Engineers, Inc., recently formed for the purpose of uniting the activities of both organizations. The Personnel Research Federation was founded in 1921, with its chief purpose to aid in the cooperative solution of problems of personnel.

The Association Press, 347 Madison Avenue, New York City, announces the recent publication of a study made by Dr. Hedley S. Dimock, Dean of George Williams College, Chicago, entitled "Rediscovering the Adolescent." This study was undertaken to provide a fundamental understanding of "normal" boys for the teacher, the parent, the group leader, and all others who work with young people. Heretofore, much attention has been given to the study of the infant and the small child, to the genius and the subnormal, but the everyday adolescent has somehow been neglected, according to Dr. Dimock. The data were based on the systematic and scientific study of two hundred boys between the ages of twelve and sixteen for two years. A combination of procedures, including standardized tests, physical examinations, interviews and case studies, was used in securing the data. Some of the findings are startlingly in conflict with "what everyone knows," particularly about the relation of sex development to growth or change in play interests, religious ideas, and certain other aspects of personality.

A grant of $135,000 from the General Education Board for the three year support of the activities of the Committee on Motion Pictures in Education was recently announced in Washington by George F. Zook, president of the American Council on Education. With this grant a clearing house of information and activity on visual problems and the coordination of work of other centers interested in films will be established under the direction of Charles F. Hoban, Jr., associate in motion picture education.

"The Development of Linguistic Skill in Twins, Singletons with Siblings, and Only Children from Age Five to Ten Years," by Edith A.

Davis, former lecturer in parent education in the University of Minnesota's Institute of Child Welfare, has just been published by the University of Minnesota Press. "While there was much overlapping, when comparisons were based on sex, occupational status, and intelligence, the group differences were clear cut, and gave a slight superiority to girls over boys, to the upper socio-economic groups over the lower, and to the more intelligent children over the less intelligent," writes Dr. John E. Anderson, Director of the University's Institute of Child Welfare.

The World Book Company announces the publication of Durrell-Sullivan Reading Capacity and Achievement Tests for intermediate grades 3 to 6, and the Durrell Analysis of Reading Difficulty for grades 1–6. Dr. Durrell is the Director of the Educational Clinic, Boston University, and Helen Blair Sullivan, the Associate Director.

The Guidance Institute of the University of Oklahoma was held December 9, 10, 11, 1937. In addition to several general sessions, group panels devoted to special types of guidance were held each day. Among the speakers on the various programs were Dr. E. G. Williamson, Director of the University Testing Bureau, University of Minnesota; Dr. H. Meltzer, Director of the Psychological Service Center, St. Louis, Mo.; and Dr. M. O. Wilson, Professor of Psychology, University of Oklahoma.

This JOURNAL has received the first monthly letter of the Institute for Propaganda Analysis, a non-profit corporation organized for scientific research in methods used by propagandists in influencing public opinion, and to help the citizen detect and analyze propaganda. The officers of this organization include Hadley Cantril, President; Ernest O. Melby, Vice-President; Clyde R. Miller, Secretary; and Robert K. Speer, Treasurer, with a board of twelve advisers. The Institute's headquarters are located at 132 Morningside Drive, New York City.

The University of Minnesota Press announces the publication of a book on "The Development of Children's Concepts of Causal Relations," by Jean Marquis Deutsche. The answers, given by 732 St. Paul and Brainerd school children between eight and sixteen years of age, to questions about scientific and natural phenomena are found to be mainly materialistic in character. The study also reveals that children's ability to think along these lines is determined more by their schooling than by native intelligence.

BOOK REVIEWS

ANASTASI, ANNE. *Differential Psychology.* The Macmillan Company, New York, 1937. Pp. xvii – 615. Price, $2.75.

While differential psychology has long been recognized as a legitimate, and indeed an important division of the field of psychology, its status has never been an entirely satisfactory one. Courses have been offered in most of our more significant colleges and universities under such titles as *Individual Differences; Individual, Sex and Race Differences,* and the like, and have often been among the more valuable courses offered. Textbooks in such varied divisions as general psychology, mental measurements, and the psychology of advertising and salesmanship have dealt at greater or less length with individual and group differences.

In most other divisions of psychology, insofar as they have come to be generally recognized as of sufficient scope and importance to constitute separate college courses, we have had from just barely enough to far too many textbooks. Differential psychology, while it has fared reasonably well at the hands of investigators, has fared badly at the hands of the textbook writers, if only in that we have had so few books, and have had them only recently.

While it is not the purpose of this review to judge the earlier texts in this subject, those of Ellis and Freeman, the fact remains that teachers have, to a considerable degree, continued to send their students to original sources exclusively for their reading, supplementing these by lectures and reports. It may be as some believe that this is the best method of teaching any advanced course. Or it may be that the books already available should have made the present one unnecessary. Be this as it may, there appears to be a place for another book, if only to meet the requirements of those not satisfied with their present method of instruction.

How, then, has the writer met this need? She has dealt with her subject in a sufficiently inclusive manner to cover a wide variety of interests. In addition to the usual subjects of individual, race, and sex differences, and the nature and extent of individual differences, we have chapters dealing with heredity and environment in their relation to such differences, mental growth, variation within the individual, urban and rural comparisons, and a discussion of the individual as a member of multiple groups.

She has presented her material explicitly in that data, tables, graphs,

and experimental results are given in abundance throughout the book. Whatever the writer has to say is pertinent and succinct. Yet the book is highly readable, clear, and understandable. It is, both as a textbook and as a general treatise on the subject, admirably done. The teaching of any course dealing with human differences should be both different and better because of Miss Anastasi's book. And from the student's point of view, so should be the taking of such a course. This, the reviewer believes, should be true whether the book is used as a basic text, or only as a supplement to other texts or methods of teaching.

AMOS C. ANDERSON,
Ohio University.

Studies in Clinical Psychology. Directed and edited by LEE E. TRAVIS (Vol. III, 1937). Psychological Monograph edited by J. F. Dashiell; University of Iowa, studies edited by C. A. Ruckmick.

The contents of this volume includes nine studies, seven of which are doctoral theses. Four of the theses are experimental "analysis of stuttering and the neuro-physiological processes underlying voluntary, conditioned reflex, and reflex behavior in man." Three are contributions to physiological psychology. The remaining two are studies of the effect of training upon handedness preferences of rats, and of "whether a stutterer is affected in his speaking by listening to other stutterers." All studies were made under the able direction of Professor L. E. Travis and form a part of a large program of research in Clinical Psychology.

Obviously, the reviewer cannot integrate 246 pages of highly technical material dealing with various specialized topics in the short space of a review. Consequently, the research and its author with a few outstanding points will be mentioned. The studies follow.

"The Study of the Pupillary Reflex, with Special Reference to Stuttering," by Warren H. Gardner.

Choosing the pupillary activities as source material for studying the functioning of the central nervous system under carefully controlled conditions, records were made of pupillary changes to light under the following extra-stimulation conditions: speech, bell, electric shock, gun shot, needle prick, and hand contraction.

The purpose was to compare pupillary behavior of stutterers with that of normal speakers under these conditions. The results indicate that "The normal pupillary response to light is altered consistently in dilated diameter, the various speeds and amounts of contraction, and minimum diameter, when spasms are present in the speech of the stutterer." These facts seem to indicate disorganization of nervous functioning during spasms.

"Dysintegration in the Speech Musculature of Stutterers During the Production of a Non-Vocal Temporal Pattern," by Yuba L. Hunsley.

"If stutterers show a marked inferiority to normal speakers in their ability to perform a pattern of movements in time with the jaws, lips, tongue, and abdomen," then the hypothesis upon which rests Travis's theory of stutterers lacking a dominant cerebral gradient is substantiated. Records of jaws, lips, tongue, and breathing movements by means of appropriate apparatus were made for normal speakers and stutterers, while silently reacting to a temporal pattern of auditory clicks. From these records, the author concludes that "Stutterers were inferior to normal speakers in their ability to perform a silent pattern of movements in time with the speech musculature." The hypothesis "that stutterers lack a dominant gradient sufficient to integrate the bilateral speech musculature . . . is in part substantiated."

"An Analysis of Associative and Predisposing Factors in the Symptomatology of Stuttering," by Alonzo Morley.

Calling attention to the evidence that stutterers differ from normal speakers in various measurements (respiratory, articulatory and phonative) used in the speaking act, the investigator proposes to answer the following questions: "Are changes in measures of physiological function occurring in the stutterer expressions of the stuttering spasm itself, or are these changes the reactions of functioning physiological systems to stuttering?" Taking eye-movements in reading, breathing, and the action of the masseter muscles in articulation as expressive of the speech mechanisms, the author subjected stutterers to eight experimental conditions of silent reading and speaking situations. Records show that the frequency of abnormalities of breathing and of action current varied with the situations for those who stuttered. "The decrease in the degree of efficiency of eye-movements in stutterers during stuttering seems to be a reaction to difficulty present in one of the physiological mechanisms used in the speaking act, namely verbalization."

"A Study of the Extent of Dyssynergia Occurring During the Stuttering Spasm," by Charles Strother.

Stating that most previous work on stuttering had been directed at symptomatology, Dr. Strother attacked the problem of the overt spasm itself. After formulating certain criteria of the "spasm," this investigator made simultaneous records of respiratory activities, of vocal tones, of action currents from homologous facial muscles, and of vertical and horizontal eye-movements. There seemed to be little consistent relationship between the measured records of abnormalities and the clinically observed overt spasm. "Voice and breathing abnormalities bear the highest temporal correlation to the overt spasm." The author states that spasms may not have been clinically detected or else dyssynergia expressed itself too subtly for the apparatus to detect it.

We turn now from clinical studies of stuttering to those of physiological psychology.

"An Electromyographic Study with Respect to Speed of Movement and Latency, Disparate and Reciprocal Innervation, Attention and Relaxation," by Basu Kumar Bagchi.

Raising the two great problems of mind-body relation, namely "What are the underlying neurophysiological processes subserving psychological processes?" and "How may physiological processes be affected by mental activity?" Bagchi's problem resolves itself into the following: "(1) the relationship between the speed of movement and action current latency under different conditions; (2) the temporal and synergic factors in reciprocal innervation of antagonistic muscles (biceps and triceps); (3) disparate innervation of the two heads of biceps; (4) possible sources of passive movement discharges; (5) action current frequency in attention and imagining; (6) post-relaxation latency in voluntary movement." Using oscillograph, oscillator and signal circuit with special photographic arrangement, the electro-physiological measures were made. Among other things were found: "The faster is the speed of movement, the shorter is the latency, and up to a certain point, the slower the speed the longer the latency." "In a so-called reciprocal innervation of antagonistic muscles, it was found that when the agonist acted against gravity and friction, the antagonist did not relax, but cooperated. . . ." This means that in voluntary movement, cooperative innervation with a temporal relationship occurs. "The evidence seems to point to the conclusion that the decrease of action currents in passive movement was due not necessarily to slow speed . . . but to the way the S reacted to the situation of his arm movement. If he became accustomed to the latter and paid little attention to the passive movement while it was going, there were no discharges." This is a highly significant piece of work in the reviewer's judgment.

"Action Current Study of Conditioned Hand Withdrawal," by Arnold Henry Hilden.

This investigation deals with "the development of the conditioned hand withdrawal, by means of the action current technique. Not only the development of the conditioned response to a flash of light with a condenser discharge as unconditioned stimulus but extinction and a comparison of conditioned hand withdrawal with voluntary movement was made. These measures were in terms of progressive increase and decrease of action currents, action current latencies, response latencies and others. The results show that, "during establishment, the conditioned response appeared first only in the form of slight muscular contractions and developed to the point where overt movement appeared. Extinction presented a reversal of this order of events." Handedness showed no general relation to rate of conditioning and extinction.

"Action Current Patterns of Homologous Muscle Groups During Reflex Activity," by Mervin Patterson.

From some experimental evidence supporting the theory of cerebral dominance, the author conceived the possibility that action current records of reflex activity from two sides of the body might indicate the dominant of the two hemispheres. In addition, records were examined for evidence of interrelationship between the same reflexes on the opposite sides of the body. Apparatus was adapted to human and dog subjects. "Action current records of simultaneous bilateral reflex responses were taken from quadreceps femoris, gastrocnemius, and masseter muscles." Records were taken from human and dog subjects; normal subjects and subjects with lesions. "No significant differences in latency and pattern of records from homologous muscle groups in normal Ss were discovered." Marked similarity between reflex patterns of two homologous sides was found. This similarity was independent of several factors. "Both latency and pattern of the reflex response of the affected side may be altered by unilateral neural lesion of the higher centers."

"The Effect of Training Upon the Handedness Preference of the Rat in an Eating Activity," by Robert Milisen.

"The purpose of this study is to show experimentally some of the influences of training upon handedness preference in the rat." The experimenter made use of two test cages and one training cage. All rats were forced to eat from the training cage. The training effect was noted by using a modification of Tsai and Maurer's technique. Some tentative conclusions are: Training can change handedness in some but not all rats. Disability of the preferred hand does not change preference. The older the rats, the more firmly fixed is handedness preference. A shift in handedness is more easily accomplished by training in female than in male rats.

"The Influence of Emphatic Response on Frequency of Stuttering," by C. Van Riper.

To test the popular notion that stuttering is caused by imitation and influenced by the presence of another stutterer, the experimenter followed the procedure of having a stuttering subject enter the experimental room in which were two experimenters, one a normal speaker and the other a severe stutterer. He was asked to pronounce a list of fifty words following the calling aloud of each word on this list by each experimenter. It was found that "When stutterers attempted to pronounce words which had just previously been pronounced by a normal speaker or bad stutterers, they stuttered more frequently in the latter situation."

These studies, particularly the first seven, have set a high level from the standpoint of envisaging crucial problems and in devising techniques with which to attack them. If research along this line continues fruitful, a future clinician will have to know something more than how to get qualitative data and administer tests. It is a pioneer work which Pro-

fessor Travis and his students are doing; a very fundamental work in the judgment of the reviewer.

JAMES A. PATRICK,
Ohio University.

S. D. PORTEUS. *Primitive Intelligence and Environment.* New York, The Macmillan Co., 1937. x + 325 p.

In 1931 Dr. Porteus published his *Psychology of a Primitive People* which was concerned with the Australian aborigines. The purpose of the present volume is primarily to compare the Australians with the Bushmen of South Africa. Porteus is concerned with race differences and not with racial superiority or inferiority. Therefore, by comparing two primitive tribes he can eliminate the emotional, autistic elements that are probably always present when non-white groups are compared with whites.

As in the earlier volume most of this one is taken up with a description of the African environment and Porteus' travels therein. Three chapters are devoted to a condensed recounting of his Australian travels and nine chapters to the present African trip. There can be no doubt that the author has a very facile pen and his travel descriptions are extremely entertaining reading. Unfortunately the present book has neither maps nor illustrations, so that it is not always easy to picture the geographic relation of the places Porteus mentions. The thirteenth chapter contrasts the Australian and African environments and in the remaining six chapters the results of the author's testing program and of several subsidiary studies on Asiatic primitives are reported.

The conclusions of the study may be summarized thus. The Australian environment (especially in the interior) is the acme of deserts with a drastic lack of game and water, while the Kalahari of the Bushmen, although still desert in character, has a relative abundance of game and water. In spite of the more favorable environment the Bushmen are consistently in last place in all of the tests given to them. "They are by no means as educable as the Australian aborigines." The Australians are superior in planning ability as shown by the Porteus Maze. "In imaginative skill the advantage is on the side of the Bushmen, while in mastery and use of environment the two races are adjudged to be on a par."

Porteus seems to approach his problem with greater objectivity in this volume that he has in the past. He is equally at war with the equalitarians and the racial superiority advocates. The reader cannot help but feel confidence in the shrewd observations and insights of the author. However, those whose scientific training leads them to depend more upon quantitative reliability rather than shrewd insight will be disappointed. The size of the various tribal groups tested ranges from 14 to 65, and the groups most specifically compared—the Bushmen and the natives of Central Australia—both consist of only 25 adult, male subjects. There

might be some questioning of the evaluation of two tribal groups, when the comparison rests on such small populations.

C. M. Louttit,
Indiana University.

J. P. Guilford. *Psychometric Methods.* New York: The McGraw-Hill Book Company, 1936. xvi + 566.

Since the field of psychometrics is of considerable size, many persons engaged in cultivating one part of the field do little to cultivate other parts. Guilford in his *Psychometric Methods* has brought two large parts of this field, mental testing and psychophysics, under simultaneous cultivation. He noted that these two divisions have the same statistical background and that each could profit by closer contact with the other. Included are such topics as psychophysical methods, correlation, curve fitting, scaling methods, the more customary statistics of testing, and multiple factor analysis. Most of the techniques are illustrated by examples.

It is a difficult feat to include such a scope of subject matter in one volume, and in a manner satisfactory to the specialists in the various topics both statistical and psychological. The book has been organized more in the fashion of a psychologist rather than that of a statistician.

In the attempt to cultivate such a large field, several weeds have not been eliminated. Rather than listing each variety of weed by name, a few of the more obvious will be specifically mentioned. No mention of checking formulas was noted, while the less adequate method of checking computations by an independent computer was recommended. The rule for rounding of numbers is not as unambiguous as it might be. The discussion of "measurements as errrors" might be clearer if the approach were "measurements contain errors." The conclusion that "no mode is a very reliable kind of average" is valid for the crude modes cited, but may not hold for a mode computed by a more refined method. The term decile is used to indicate an interval rather than a point. The correlation term in the standard error of a difference of means is arithmetically correct but may lead to misuse in finding the standard error of the difference of other statistics.

These do not constitute at all a random sample of the weeds that could be listed. However, they might be summarized as the continuance of some of the carelessnesses that have crept into the psychometric literature.

The major contribution of such a volume is its promotion of closer interrelations among the various methods of psychological measurement. *Psychometric Methods* is likely the forerunner of a number of books which will, each in turn, bring greater unity and order into the field of psychometry.

Harold A. Edgerton,
Ohio State University.

NEW BOOKS AND PAMPHLETS RECEIVED

Books and pamphlets for review should be sent to JAMES P. PORTER, *Editor*, JOURNAL OF APPLIED PSYCHOLOGY, Ohio University, Athens, Ohio.

Abnormal Psychology: Student's Outline Series. RALEIGH M. DRAKE. Longmans, Green & Company, New York, 1937. 75 cents. 136 pp.

The Administration of Personnel in Correctional Institutions in New York State. D. ROSS PREGMIRE. Bureau of Publications, Columbia University, New York, 1937. $2.10. 182 pp.

Behavior and Background of Students in College and Secondary School. RUTH STRANG. Harper & Brothers, New York, 1937. $4.00. 515 pp.

Behaviorism at Twenty-Five. A. A. ROBACK. Sci-Art Publishers, Cambridge, Mass., 1937. $1.75. 256 pp.

Character and Personality of Children from Broken Homes. NEHEMIAH WALLENSTEIN. Bureau of Publications, Teachers College, Columbia University, New York, 1937. $1.60. 86 pp.

Child Guidance Procedures. Institute for Juvenile Research. PAUL L. SCHROEDER, Director, Chicago, Illinois. D. Appleton-Century Company, New York, 1937. $2.50. 362 pp.

Concepts and Problems of Psychotherapy. LELAND E. HINSIE. Columbia University Press, New York, 1937. $2.75. 199 pp.

Counseling Technics in College and Secondary Schools. RUTH STRANG. Harper & Brothers, New York, 1937. $2.00. 159 pp.

The Education of Personality. M. M. SUFIAN. B. Akmed, from the Derbar Press, 63 Collin Street, Calcutta, India, 1937. 168 pp.

El Paso School Standard, Vol. XV, No. 11, January, 1938. Official publication of the City Schools, El Paso, Texas. 45 pp.

Emotional Hygiene: The Art of Understanding. CAMILLA M. ANDERSON. J. B. Lippincott Company, Philadelphia, Pa., 1937. $2.00. 242 pp.

Experimental Social Psychology: Revised Edition. GARDNER MURPHY, LOIS BARCLAY MURPHY AND THEODORE M. NEWCOMB. Harper & Brothers, New York, 1937. $4.00. 1121 pp.

How to Develop Personal Power. DICK CARLSON. Harper & Brothers, New York, 1937. $2.00. 228 pp.

Personal Development Manual. DICK CARLSON. Harper & Brothers, New York, 1937. $1.00. 69 pp.

Personality: A Psychological Interpretation. GORDON W. ALLPORT. Henry Holt & Company, New York, 1937. $3.50. 588 pp.

Rediscovering the Adolescent. HEDLEY S. DIMOCK. Association Press, 347 Madison Avenue, New York, 1937. $2.75. 287 pp.

A Study of Personal Reactions to the Solmization Method of Teaching Music Reading. CLEL THURMAN SILVEY. George Peabody College for Teachers, Nashville, Tenn., 1937. 82 pp.

Visual Perception. M. D. VERNON. Macmillan Company, New York, 1937. $4.50. 247 pp.

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